Chemical Age

DU PONT NEOPRENE PLANT ON STREAM

(page 839)

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21 May 1960

THE WEEKLY NEWSPAPER OF THE CHEMICAL INDUSTRY

INDEX TO ADVERTISERS

The first figures refer to advertisements in **Chemical Age Directory & Who's Who,** *the second to the current issue*

(*Continued on page 828*)

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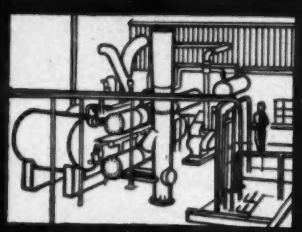

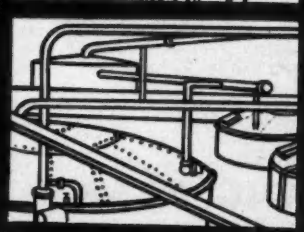

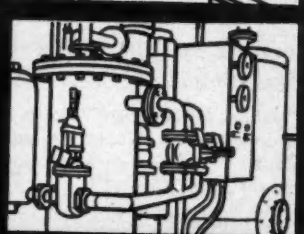

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IN THIS ISSUE

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CO_2 REMOVAL PROCESSES

CONSIDERABLE interest is currently being shown in new methods of extracting the acidic constituents such as H_2S and CO_2 from industrial gases. Wet methods of purification have received special attention because of the ease with which liquids can be handled, measured and controlled as compared with solid substances. At the same time, continuous extraction of these acidic gases can be effected without difficulty.

Earlier processes, e.g. the Seaboard process, first absorbed the H_2S in an alkaline solution which was then regenerated by passing air through the liquid, the H_2S being set free in a concentrated form so that it could be treated in Claus kilns.

In the Ferrox process, the gas was washed directly with a suspension of ferric hydroxide in an alkaline solution. The sulphur was recovered in the elementary form but the process had the disadvantage that the washing liquid contained solid iron hydroxide, particles of which adhered to the sulphur and so reduced its value that its use was practically confined to burning for the production of sulphuric acid.

In page 842, are given details of the Giammarco-Vetrocoke process for which Coppée (Great Britain) have been granted the right to construct plants throughout the world. This relatively new process has the advantage of being able to remove both H_2S and CO_2 from the crude gas, either at the same time or separately. As stated in p. 842, the crude gas passes through a scrubber countercurrent to a solution of alkaline arsenic compounds in the presence of a catalyst.

At the annual meeting of the Natural Gasoline Association of America, details were released of a new Fluor solvent removal process. According to Fluor, the cost of CO_2 removal is 0.020 cents per 100 cu. ft.; with other methods, the cost is said to range from 0.026 cents to 0.043 cents.

Changes in feed composition or specifications can markedly change the economics of the process. If lower CO_2 concentrations are called for, the Giammarco-Vetrocoke process can provide them with little extra cost. On the other hand, the Fluor process is said to become more attractive if specifications are relaxed to 3% CO_2. Higher CO_2 partial pressures favour the U.S. process, while lower pressures, swing the pendulum to Giammarco-Vetrocoke, it is stated.

In the Fluor process, the solvents include propylene carbonate and three acetates. The process relies on physical absorption rather than chemical reaction to strip out CO_2. It can operate at sub-ambient temperatures taking advantage of 'free refrigeration' available as CO_2 expands from relatively high absorption pressures (about 800 p.s.i.) to atmospheric. The process is also said to need little, if any, auxiliary power in some cases, because desorbed CO_2 and high pressure solution pass through power recovery turbines, which in turn provide power for pumps.

Three U.S. Patents (2,926,751, 2,926,752 and 2,926,753) have recently been granted to Fluor covering propylene carbonate, glycerol triacetate, butoxy diethylene glycol acetate and methoxy triethylene glycol acetate. In pilot plant tests, the CO_2 content of natural gas was reduced from 53% to less than 3%. The process is best suited for natural gas low in heavy

hydorcarbons which contains high concentrations of CO_2.

The process is to be used by El Paso Natural Gas in West Texas to process 100 million cu. ft. per day of residue gas. The unit is due on stream in December this year. In the process CO_2 is removed from gas in a conventional countercurrent absorption column. Gas enters at the bottom, solvent at the top at ambient or sub-ambient temperatures. The solvent also absorbs water vapour, hydrogen sulphide and mercaptans, if present, and a small amount of hydrocarbons.

Because CO_2 is flashed off at atmospheric pressure, lean solvent returning to the absorber contains CO_2 equivalent to one atmospheric partial pressure. This CO_2 content of the gas cannot be reduced below that level.

ARGON FROM AMMONIA SYNTHESIS

ALTHOUGH it is not normal practice to recover argon in ammonia synthesis, an interesting development is reported from the Pet Nitrogen Works in Hungary where preliminary installation has been completed of an argon recovery unit. This recovers argon from ammonia synthesis gas.

In the synthesis gas, argon is enriched and the concentration increases further in the synthesis system. Up to the present, the inert gases argon and methane are blown out of the cycle with a consequent great loss of nitrogen and hydrogen. The new plant produces argon and methane as well as nitrogen and hydrogen as a mixture. Nitrogen and hydrogen are returned to the cycle, methane is burned as fuel and argon is used for welding purposes.

Such a recovery unit would not be an economic proposition in countries with large argon producing specialists, such as the British Oxygen Gases in the U.K. Probably one of the few other plants in the world where argon is recovered is that of I.C.I. Billingham, where this has been done from ammonia synthesis gases for several years. Argon produced is for I.C.I. captive use.

One of the main uses in I.C.I. is, of course, the production of titanium. A very pure argon atmosphere is used to ensure that embrittlement does not occur due to the combination of titanium with other elements. A stream of argon is passed continuously through gas-tight furnaces used for the production and heat treatment of titanium. Not only is argon used in the welding of titanium, but the welding of large assemblies are carried out in plastics tents in which a pure argon atmosphere is maintained.

At present British Oxygen Gases and their competitors supply enough argon to satisfy total home market demands. There is no need for imports, in fact large quantities are exported. Over the past 18 months B.O.G. have supplied argon to Bahrein, Ghana, Hong Kong, India, Malaya, New Zealand, Pakistan, South Africa, Trinidad, Greece, Iran, Iraq, Israel and Yugoslavia.

In the Argonarc welding process argon acts as a shroud to prevent oxide formation and other contamination of the weld. Welding of magnesium alloys was the first main use of argon and success there has led to the process being extended to aluminium, stainless steel, copper and light alloys.

No reliable figure is available of U.K. production or supply of argon but U.S. production has risen twenty-fold since 1947—from 20 million cu. ft. to an estimated 1959 total of 440 million cu. ft. Actual capacity as at January 1960 of 19 companies (compared with three companies in 1951) was 1,000 million cu. ft. of 99.95% or higher purity argon.

Apart from welding process, argon is also used as an inert protecting atmosphere in the preparation and shipping of very pure metallic sodium; induction furnace melting of alloys; sintering of metal powders, such as titanium and zirconium; drawing of tungsten wires and filaments; production of electric lamps and electronic tubes; fabrication of high-speed metal-cutting tools; and in the reduction of titanium and zirconium tetrachloride with magnesium.

When bubbled through molten metals, argon flushes out dissolved gases with a consequent decrease in metal porosity. Niobium, tantalum, molybdenum and tungsten at temperatures of 3,000°F and above are soon to be fabricated in the U.S. in a sealed, argon-filled room, operators moving in ' space suits ' into which fresh air is pumped and from which expired CO_2 is exhausted.

DIISOCYANATES AND HEALTH

THE health problems arising from the increased use of diisocyanate compounds and possible measures taken to improve matters in one particular plant have been described by A. Munn (*The Transactions* of the Association of Industrial Medical Officers, January 1960, **9**, 4).

Of the two compounds, toluylene diisocyanate (TDI) and diisocyanate-diphenyl methane (MDI), most widely used at the moment, TDI is more dangerous due to its high volatility even at normal temperatures. MDI is practically non-volatile under normal conditions but in an atmosphere of steam sufficient vapour may be inhaled to be hazardous.

Reports from France, Sweden, Germany and the U.S. suggest that diisocyanates act as lacrimators, respiratory sensitisers and skin sensitisers.

Measures taken to ensure safety include the provision of a specially prepared decontaminatory fluid, consisting of methanol (50%), water (45%) and concentrated ammonia liquor (5%), which should always be kept available for treatment of spillage. In spite of precautions, other measures needed to be taken, such as the use of respirators when the concentration of TDI might be expected to be undesirable, frequent analysis of the general atmosphere, and, as a last resort, the transfer of sensitised workers.

DEODORANT SALES IN U.K.

COMPARATIVE figures for antiperspirant and deodorant sales in Scandinavia and the U.S. seem to indicate that at home a sizeable market for these preparations remains as yet unexploited, while reports of new and expanded chlorohydrate plant suggest that British manufacturers are alive to this fact.

Capacity of the new Albright and Wilson plant for the manufacture of aluminium chlorohydrate has not been revealed, but it has been arranged to coincide with an anticipated rapidly-increasing demand for the material during the next few years, both at home and overseas.

One estimate of usage of these preparations puts the proportion as high as 90% of the women of the U.S., and 70% for Scandinavian countries, while in the U.K. it appears that only 40% of the adult female population has been sold on this aspect of personal hygiene to date.

A new A. and W. booklet describes some of the properties and applications of aluminium chlorhydrate, the most widely used astringent. While the company makes almost the complete range of soluble aluminium salts with antiperspirant and deodorant properties, the chlorhydrate has a decisive advantage over the others in combining high astringency with suitability for use over a wide range of solid and liquid preparations.

An important advantage of aluminium chlorhydrate is that it may be used in a much wider range of formulations.

Project News

Du Pont Neoprene Plant on Stream at Maydown, Northern Ireland

NEOPRENE synthetic rubber is now in commercial production for the first time at the Maydown Works, Londonderry, N.1, of the Du Pont Co. (United Kingdom) Ltd. The first pounds of neoprene came off the production line on 12 May, marking the beginning of operations. Mr. John C. Weyrich, works general manager, says "We will shortly be able to supply the growing demands not only of the U.K., but also those of West European and Commonwealth countries."

Located on a 365-acre site at Maydown on Lough Foyle, the works are designed to produce the various types of neoprene synthetic rubber and neoprene latex in greatest demand for a variety of end-products. About 400 men and women, most of whom come from Northern Ireland, are employed.

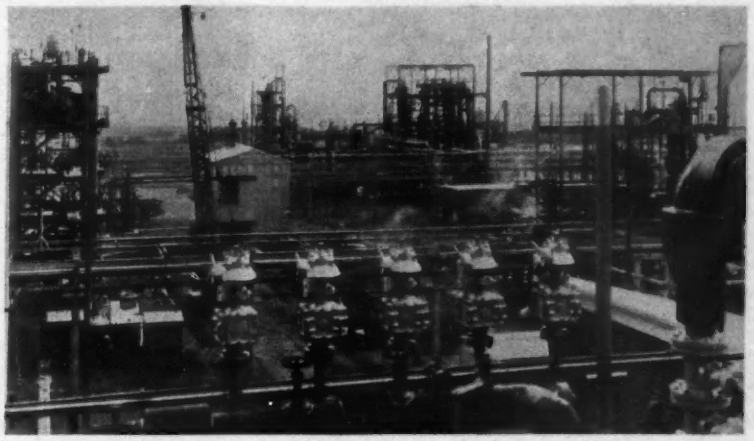
There are four major production areas, including facilities for the manufacture of nitrogen, hydrogen, hydrogen chloride and other chemicals necessary for the polymerisation process. There are eight main buildings comprising an administration building, canteen, engineering shops, stores, change house, medical centre and a quality control laboratory.

Mostly U.K. Equipment

Maydown Works are equipped with the latest type of machinery, 95% of which was purchased in the U.K., the rest in West Europe and the U.S. Building began in January 1958, and at the peak period of construction about 1,200 people were employed. Major part of the construction personnel was recruited locally. Design and engineering consultation was furnished by the parent company, E.I. du Pont de Nemours and Co., Wilmington, U.S. Construction was also handled by Du Pont.

Neoprene, a multi-purpose synthetic rubber, was developed in the U.S. by Du Pont and came into production in 1931. Although neoprene matches natural rubber closely in physical characteristics, its main attribute is superior resistance to weathering and sunight, oil, heat and chemicals. In addition, neoprene does not support combustion.

Products from neoprene compounds go into virtually every industry and it is claimed that it has been used to make more types of rubber products than any other synthetic. It has found wide application in the wire and cable industry, the petroleum industry, architecture and building, the motor industry, shipping and many others. Dissolved in a solvent, it is used widely as an adhesive. Liquid compositions can be applied as durable protective coatings for equipment in chemical plants, plating shops and other locations with corrosive, fume-laden atmospheres.



Monomer area at the new neoprene synthetic rubber plant of Du Pont Co. (United Kingdom) Ltd., photographed from the top of the polymer building.

Matthew Hall and Shell Polyolefins Project

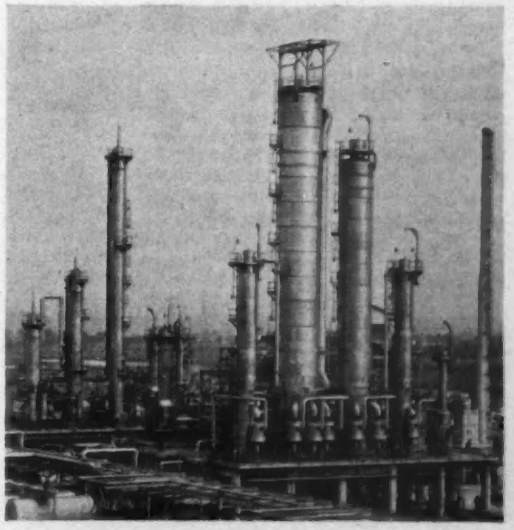
● OFFICIAL announcement of their £5½ million contract in connection with the engineering, procurement and erection of polyolefins plants and off-site facilities for Shell Chemical at Carrington, near Manchester, was made this week by Matthew Hall and Co. Ltd., Dorset Square, London N.W.1. George Wimpey Ltd. also have a £5 million contract for this plant (see also 'Distillates,' p. 840).

● FURTHER to the note in 'Project News' last week on the award of contracts for synthetic rubber drying equipment for Brazil and Australia to John Dalglish and Sons, the two large GRS dryers to be supplied for the refinery installation near Melbourne, have been ordered by Standard-Vacuum Oil, New York. This order is worth £100,000 to the Glasgow firm.

● A CONTRACT worth £3,595 has been awarded to William Boby and Co. Ltd. by the National Coal Board for a lime-soda plant at Linby Colliery.

● ROSE DOWNS AND THOMPSON LTD., a member of the Power Gas Group, have received a contract valued at about £160,000 from Kenya for a complete plant, to recover crude pyrethrin extracts from pyrethrum flower heads. This installation is the second which R.D.T. have supplied to Nakuru, incorporating the Rosedowns/Merz rotary continuous solvent extraction unit.

Shell Chemical's Styrene Monomer Plant Due in Production Soon



The styrene monomer plant built recently for Shell Chemical Co. Ltd., at Carrington, near Manchester, shortly due on stream, will have a capacity of 18,000 tons/year. Procurement and erection were entrusted to Matthew Hall and Co. Ltd.

★ AN air of mystery surrounds the new polyolefins plant being built at Carrington for Shell. This week Matthew Hall released the news that they had been entrusted with work in connection with the engineering, procurement and erection and off-site facilities (see p. 840). In fact I gave this news six months ago (28 November, p. 768).

Also last week, we reported in p. 814, the statement of Sir Godfrey Mitchell, chairman of George Wimpey, who said that his company had been awarded a £5 million contract for the complete construction of a *high-pressure* polythene plant by Shell Chemical. Both contracts total about £10.5 million and Shell Chemical confirm that they refer to their 'polypropylene/polyethylenes' plant at Carrington, but will not say how the two contracts are divided and what particular work Matthew Hall and Wimpey will carry out.

Wimpey have a civil engineering background and it may be that this will be their end of the contract, but against that must be set the statement of their chairman, which is quite specific, and the knowledge that Wimpey's have done much process construction work for Union Carbide. In any event the plant should be operational some time next year.

★ DECISION to reconstitute the Food Standards Committee to make it more independent and to ensure that equal and adequate representation is given to the various interests, has been taken by the Ministry of Agriculture. This was stated by Mr. J. Godber, Joint Parliamentary Secretary, at the annual lunch of the Food Manufacturers' Federation, held in London on 12 May.

Mr. Godber said the committee should be a little smaller and that civil servants should no longer be represented, apart from a representative of the Government Chemist. Apart from the chairman there will be three representatives of trade interests, three scientific members and three 'independents,' who will represent the interests of the consumer and the authorities interested in the enforcement of the Act.

Mr. Godber referred to the Pure Food Centenary and the need to test exhaustively food additives in view of the danger that they might have side effects which would be positively harmful to the consumer. For that reason he welcomed the good response from food manufacturers for the proposals to establish a biological testing station. He added "I hope every effort will be made to bring this important project to fruition. The safety of food and food additives can only properly be determined by means of carefully devised biological tests."

★ ARCHITECTURALLY, the new Hoddesdon factory of Merck Sharp and Dohme sets a fine example to industry. Claimed to be Merck's best production unit in the world, it incorporates many novel features. As stated in p. 845 the plant can readily be doubled in size as and when needed. M.S.D. rate their position as fifth by turnover in the U.K. pharmaceutical industry.

Merck Sharp and Dohme already contemplate the building of a U.K. research centre. Still on the planning board, this project will probably be a separate enterprise and not 'tacked-on' to one of the existing U.K. units. When I visited the plant last week, Mr. T. W. Rayner, managing director, told me that active consideration was also being given to expanding the fine chemical facilities of Thomas Morson and Sons, the Ponder's End subsidiary, to include products, such as sorbitol, that are made by Merck and Co. Inc. in the U.S.

While at Hoddeson I was reminded of some of Merck's pioneering work in pharmaceuticals. For instance Vitamins B1 and B6, pantothenic acid and biotin were synthesised by M.S.D. chemists and collaborators, while Vitamin B12 was discovered in the company's laboratories. M.S.D. aid led to the isolation of streptomycin in 1944 and its subsequent manufacture. Novobiocin was another antibiotic discovered in M.S.D. laboratories and the company can claim credit for the development of chlorothiazide. What now promises to be the most significant corticosteroid advance since cortisone itself was announced in 1958 by M.S.D. workers, who found the new hormone dexamethasone to be 30 to 40 times more potent than cortisone and to have fewer side effects.

★ PIONEERS in the fabrication of large vessels in aluminium, the A.P.V. Company Ltd. will on 10 June celebrate their 50th anniversary. Founded in 1910 by Dr. Richard Seligman as the Aluminium Plant and Vessel Co. Ltd. to develop commercially a patent for the welding of aluminium, the company initially employed one scientist and one coppersmith—an alliance of science and craftsmanship that has been maintained ever since. Dr. Seligman, who retired as chairman in 1958, is still with A.P.V. as president.

Development of welded fabrication of aluminium, and later in stainless steel, the invention in 1923 of the Paraflow plate heat exchanger and the growth of A.P.V. as process engineers, built up the company as one of the leading manufacturers of process plant for the chemical, dairy, brewery and food industries. Today, nearly 2,000 people are employed at Crawley, Sussex, and a large overseas organisation has been created, based on eight associated companies, four with their own factories. To mark the anniversary is a new booklet—'A.P.V., 1910-1960'.

★ WHEN lubricating oil has been in use for some time it becomes contaminated with oxidised products and other impurities and loses its effectiveness as a lubricant. Reconstitution and reblending to the specification of new oil by a laboratory-controlled process, eliminates waste.

First stage in the process involves removing all traces of moisture. The dehydrated oil is then sprayed with concentrated sulphuric acid, and the oxidised products are precipitated and run off from the reactor. The sour oil is then neutralised with alkali, treated with activated clay and finally filtered. If, as is often the case, the contaminated oil has lost its viscosity, new blending stocks are added, together with the necessary additives, to bring the oil up to its correct specification.

Midland Oil Refineries Ltd., Bromford Lane, West Bromwich, Staffs, who specialise in the re-refining of all types of contaminated oils, offer a service to industry that includes the collection of contaminated oil and delivery of the re-refined oil at a cost of approximately 2s a gall. Their laboratory service is available free for the inspection and testing of contaminated oil for present and prospective users.

★ WARNING on the use of trichloroethylene and tricresylphosphate in office photocopying equipment has been given by Dr. J. C. Graham, an industrial medical officer, in a letter in *The Lancet* last week. He pointed out that the former could produce mental changes due to prolonged absorption and is a drug of addiction; the latter can bring on a condition that may be mistaken for poliomyletis.

Tricresylphosphate is equally toxic and is absorbed through the skin. Dr. Graham declares that photocopying is likely to be carried out by young women who are often ignorant of the hazards of the process. He adds that much of the work is done in the least suitable places, including ill-ventilated basements.

An alternative method, the use of a mixture of equal parts of carbon tetrachloride and castor oil is, according to Dr. Graham, equally suspect because of the anaesthetic effect of carbon tetrachloride and "the same chronic effect on the kidneys and liver".

Alembic

Plant Protection to Handle Dowpon

NEW appointments announced by Dow Agrochemicals Ltd., 48 Charles Street, London S.W.1, coupled with a distribution agreement reached with Plant Protection Ltd., are expected to enhance considerably the technical advisory service on the use of Dowpon, a safe, systemic, couch, reed and grass weedkiller. Dow Agrochemicals have considerably increased their staff of technical representatives, and their services, together with those of the technical advisory staff of Plant Protection Ltd., will be available to farmers.

At the same time Dow have appointed Mr. Harry Lawson as crop protection advisor. Mr. Lawson has had two years' practical experience of 'chemical ploughing' with the aid of Dowpon in New Zealand.

Under the same agreement, Dow Agrochemicals have appointed Plant Protection as 'super distributors' for Dowpon. In addition to the extensive distribution organisation built up by Dow, which will continue to expand, farmers will also now be able to purchase Dowpon through accredited Plant Protection agents throughout the U.K.

Both companies expect that an even wider sales distribution of Dowpon will result from the agreement, which was reached because of rapidly growing demand from farmers and the fact that new applications arising from years of trials by U.K. agricultural research institutions and by Dow experts were creating new markets for the chemical.

Farmers Use More Basic Slag Than Ever

BRITISH farmers used more basic slag during the nine months ended 31 March than in any similar period of the last 20 years. In fact, the 650,000 tons of home-produced basic slag delivered between July 1959 and March 1960 exceeded deliveries during the whole of any one of the previous nine years.

Demand has been at an exceptionally high level due partly to the unsually dry summer of 1959 and partly because this continued to some extent throughout the winter. The poor growth due to the drought facilitated applications to grassland in July, August and September. This steady demand, month by month since last July, is undoubtedly the main factor which has enabled home producers of basic slag to produce at full capacity. Storage capacity at works is limited and full output can only be attained when farmers are able to take delivery of the basic slag as it is produced.

Expansion in the steel industry has resulted in additional supplies being made available in response to the phenomenal steady demand. Basic slag is no longer exported. The entire output—and even some imported basic slag—is now used to provide phosphates, lime and magnesium and some minor elements to increase the outputs and quality of Britain's grassland.

SHELL ENTER COMPOUND FIELD WITH IMPORTED FERTILISER

ENTRY into the compound fertiliser market is being made this month by the Shell Chemical Co. Ltd. with 'Shell No. 1', a new highly concentrated compound with an analysis of 17% N, 11% P_2O_5, 22% K_2O, which gives a total of 50% plant nutrients—claimed to be a higher percentage than any other granular compound currently on the British market. This news follows the sale by Shell Chemical for the past four years of their nitrogenous fertiliser, Nitra-Shell.

Like Nitra-Shell, which was initially imported from Holland, Shell No. 1 is at present being imported into the U.K. It is not yet known whether the new compound will be made in this country.

Shell No. 1 with a plant food ratio of 1½:1:2, is formulated by an advanced manufacturing technique involving the use of ammonium nitrate, di-ammonium phosphate and potassium chloride. Selling price is £37 13s per gross ton in 6-ton lots, delivered to nearest station; current subsidy is £12 3s 4d per ton, making a net price of £25 9s 8d.

The new compound is particularly suitable for root crops such as sugar beet and potatoes as well as for cereals, fruit, fodder and horticultural crops. The high degree of concentration will, it is said, mean economies in transport, storage and application. A very even granulation is claimed to have been achieved; the compound has a pink colour for ready identification on the ground. It is packed in 6-ply waterproof paper sacks with an attractive outer.

To meet the demands of cash cropping needs in the U.K. the analysis has been designed to economise in phosphates, while emphasising the modern trend for increased nitrogen content and an adequate balance of potash. A proportion of the nitrogen is in the quick-acting form, while the balance as ammonium nitrogen has a sustained effect over a longer period. Although comparatively low, the phosphate content has a high degree of water solubility and is sufficient at the recommended rates of application for all but very phosphate-deficient soils.

Fertiliser Industry Approves £1M. Programme Within Freedom-from-Hunger Campaign

THE Food and Agriculture Organisation was asked by a recent meeting in Rome of representatives of the world's fertiliser industry to invite the industry to contribute $1 million over two years for an international fertiliser programme under F.A.O.'s freedom-from-hunger campaign. Attended by 41 representatives of the industry from different parts of the world, the meeting discussed a fertiliser programme developed by F.A.O. officials on the basis of interest previously displayed by the industry in the role which fertilisers could play in the campaign.

Objectives of the programme are: to promote the efficient use of fertilisers in order to increase food supplies in deficit areas and food supplies for animal production; to help governments develop national programmes of fertiliser use and production; to assist in selecting methods of spreading information on fertiliser needs and use, and to develop guidelines regarding fertilisers in foreign aid.

Work in the field, described in the report as the most important part of the programme, would include fertiliser tests on cultivators' fields and extensive demonstrations of fertilisers. It would also involve development of soil-testing laboratories and services.

The representatives approved in principle the aims, organisation and scope suggested for the programme, and agreed to recommend to their associations, companies and the industry that it deserved further examination and support. It asked that F.A.O. submit the proposal to receiving governments, who would be asked to provide staff and facilities for field studies, and to invite support from other member governments of the organisation.

F.A.O. would also invite technical-assistance agencies, both governmental and non-governmental, to participate, and would appoint an industry advisory panel to suggest revisions, priorities and phasing. The programme would then, the report says, be submitted to fertiliser associations, fertiliser manufacturers and related industries for final approval and financial support.

In the meantime, the meeting's report recommends that F.A.O. invite the industry to contribute $500,000 for the first year, and to pledge $500,000 for the second year.

Fulmer Research Institute Under Impalco Management

The Fulmer Research Institute, whose parent company, Almin Ltd., have been acquired jointly by I.C.I. and the Aluminium Co. of America, do not expect that the change of ownership will affect the institute's position as an independent institution for carrying out sponsored research. The new owners of Almin Ltd., it is stated, wish it to be clearly understood that all work undertaken at Fulmer Research Institute will remain strictly confidential to the sponsors.

Giammarco-Vetrocoke Process For Removal of H_2S and CO_2

TWO important orders have recently been received by the Giammarco-Vetrocoke organisation for the use of their process for stripping H_2S out of town's gas. The first is for the Azienda Municipalizzata Gas e Acqua di Genova (Genoa gasworks), purifying 250,000 normal c.m. (about 9 million cu. ft.) per day of gas containing 260-350 grains per 100 cu. ft. of H_2S. The second, for Soc. Edison-Officina Gas di Bovisa, Milan, is for the purification of 350,000 normal c.m. (about 12.3 million cu. ft.) per day of gas containing 525 grains per 100 cu. ft. of H_2S. Both contracts were awarded to Giammarco's Italian licensees, S.p.A. Il Gas Integrale, Milan.

As stated in CHEMICAL AGE last week, p. 806, the Coppée Co. (Great Britain) Ltd., 140 Piccadilly, London W.1, have signed an agreement with Giammarco-Vetrocoke under which Copée have been granted the right to construct plants using the process in any country in the world (see also leading article, p. 837).

The Vetrocoke process can remove both H_2S and CO_2 from the crude gas, either simultaneously or separately. Briefly, the crude gas is passed through a scrubber in countercurrent to a supply of a solution of alkaline arsenic compounds in the presence of a catalyst, under either normal or elevated pressure.

The solution absorbs the acid gases (H_2S and CO_2) and selectivity (i.e. whether both gases or only one of them are or is absorbed) is secured by suitable adjustment of the proportion of arsenite to arsenate in the solution and by adjusting the pH value of the solution.

The sour-gas containing solution leaving the scrubber passes through a digester from which it is pumped to the top of the regenerator column, down which it trickles to be met by an upward current of air. This air current converts the monothioarsenate into pentavalent arsenic compounds and simultaneously liberates elementary sulphur in the form of a froth.

The froth is filtered on a rotary vacuum filter, the sulphur being produced in the form of a filter cake of sulphur paste. This paste can, if desired, be distilled to produce distilled sulphur or it can be melted and cast into blocks.

Sulphur paste has been used in Japan and the U.S. for vulcanisation as well as an insecticide, its value being due to the exceedingly fine state of subdivision of the particles.

The Vetrocoke process can be used for removing acid constituents (H_2S and CO_2) from gases such as coke-oven gas, town's gas, water gas, producer gas, hydrocarbon gases, natural gas, synthesis gas, etc.

An advantage of the process is that it can free the gas from H_2S down to town's gas standards i.e. well under 1 p.p.m. From experience gained on existing plants the inventors claim that the process is cheaper than other processes used for the same purpose, both from the standpoint of capital investment and operating costs.

Lord Hailsham Opens New Wantage Isotope Research Laboratories

OVER the past four years the U.K. Atomic Energy Authority has been transferring its Isotope Research Division from Harwell to a site near Wantage, Berks. These new laboratories, which are nearing completion, were officially opened on 16 May by the Minister for Science, Lord Hailsham.

The purpose of the research at Wantage laboratories is two-fold; the employment of radioactive materials to develop new techniques, and the utilisation of large radiation sources which can be expected to become available in increasing quantities as fission products from spent reactor fuel elements.

The chemistry group, which is still in the process of removal from Harwell, is working mainly in the fields of polymerisation, halogenation and oxidation, with the possibility of improvements in plastics and industrial chemical processes.

These improvements lie in the future, but the Wantage laboratories are able to give direct help to the chemical industry immediately. An example of this is the test of the efficiency of the mixing process they were called upon to make in the glass industry, by the use of radioactive barium/lanthanum baked on to sand as a tracer.

The A.E.R.E. believe they will develop many techniques which will save time and money, but are experiencing difficulties in persuading industry to use the techniques developed, partly due to the fear of hazards which in most cases are non-existent, as well as to the lack of knowledge. A newly formed Industrial Liaison Group is making every effort to overcome this.

Service corridor behind the alpha - beta - gamma 'hot' bench in the newly opened U.K.A.E.A. Radiochemical Centre, Amersham (see C.A., 7 May, p. 772)

In Parliament

Commons Query Profits on Sale of Chemical

A contract entered into by the Atomic Energy Authority with an unnamed manufacturer "to supply in bulk a chemical unobtainable from any other firm, on conditions which guarantee a minimum profit of 17% in the first year rising to 45% in the fifth year" was the subject of a question in the House of Commons last week. The Minister was further asked what efforts were being made to provide alternative supplies; and whether he will make a statement.

In a written answer Sir David Eccles, Minister of Education, stated that the Public Accounts Committee will shortly have the opportunity of hearing evidence on the Comptroller and Auditor General's Report from the Accounting Officer for the Atomic Energy Vote and the chairman of the A.E.A. He felt sure the House would "wish to await the outcome of the committee's deliberations."

Disagreement on Closure of Aberdeen Research Station

The Research Establishment of the Ministry of Agriculture at Greythorpe Road, Aberdeen, which it is proposed to close down, has done very valuable work, but that work is over, stated Mr. John Hare, Minister of Agriculture, in response to a recent question on the subject of the Establishment's disposal.

It would, he continued, be a waste of the £106,000 per annum which it cost to run the institution for the work to be continued when it could be undertaken by commercial firms and not borne on Government vote. Mr. Hare also stated that he had consulted with the Secretary of State for Scotland, the Department of Scientific and Industrial Research and also the Agricultural Research Council on the subject of finding employment for the staff.

After further questions had been put forward, Mr. Hector Hughes stated that "in view of the unsatisfactory nature of the answers" he would raise the matter on the Adjournment.

O.E.E.C. FERTILISER REPORT

Nitrogenous Fertiliser Production Should Rise 14% This Year

PRODUCTION of fertilisers in member-states of the Organisation for European Economic Co-operation and the U.S. continued its upward trend in 1958-59, it is stated in the O.E.E.C. 'Ninth Study on Fertilisers' (price 7s 6d, H.M. Stationery Office, P.O. Box 569, London S.E.1).

While there was some slowing down in the rate of expansion of nitrogen output in the O.E.E.C. area, production rose by 8% to reach 3.7 million tonnes of N. Output of phosphate fertilisers also increased considerably compared with 1957-58 (by 6%) to reach 3.7 million tonnes of P_2O_5, while the steady rate of expansion was maintained for potash fertilisers, production amounting to 3.4 million tonnes of K_2O.

Fertiliser production rose more quickly in the U.S. than in O.E.E.C. countries. Nitrogenous fertiliser output was 13% higher than in 1957-58; phosphate fertiliser output rose 10%, and potash output was up 20%.

A rapid development in nitrogenous fertiliser production is forecast for 1959-60 when O.E.E.C. output is expected to rise by 13% and to amount for the first time to more than 4 million tonnes of N. Increases forecast in output of phosphate and potash fertilisers are 4% and 6% respectively. Capacity for production of all three types was higher at 1 July 1959 than a year earlier. Nitrogenous fertiliser capacity in O.E.E.C. countries amounted to 4.3 million tonnes of N, an increase of 7%; phosphate fertiliser capacity rose 6% to reach 4.7 million tonnes of P_2O_5 and potash capacity was up 3% to reach 3.5 million tonnes of K_2O.

Consumption. Consumption of fertilisers in the O.E.E.C. area rose in 1958-59 and this trend is expected to continue in 1959-60. Consumption of nitrogenous fertilisers in 1958-59 reached 2.8 million tonnes (7% up), and that of phosphate and potash fertilisers 3.4 and 3.0 million respectively (both 3% up). Forecasts for 1959-60 show a rate of increase of 6% for nitrogenous and phosphate fertilisers, and a 5% rise for potash fertilisers.

An upward trend is also reported by the O.E.E.C. in U.S. consumption, which reached 2.3 million tonnes of N, 2.2 million tonnes of P_2O_5 and 1.9 million tonnes of K_2O in 1958-59.

As in former years, the average ratio in which the three plant nutrients are used has changed but little. A relatively greater increase in the use of nitrogenous fertilisers reduced the ratio for phosphate and potash slightly. Consumption, when N = 1, of P_2O_5 and K_2O respectively in 1958-59 was: Netherlands, 0.5, 0.7; U.K., 1.1, 1.1; O.E.E.C. average ratio, 1.2, 1.1; U.S., 0.9, 0.8.

Consumption of fertilisers in kg. of plant nutrient per hectare in 1958-59 gave Holland a figure of 203, West Germany 156, the U.K. 87, France 69, Spain 32, and the U.S. 17.

Nitrogenous Fertilisers. The trend of recent years has been towards a more rapid development of 'other nitrogenous fertilisers' and complex fertilisers (in terms of N content) than of any other type and that trend was not reversed in 1958-59. Output in both cases rose by 19%. Production of urea rose by 21% to reach 112,000 tonnes of N; output of ammonium sulphate and calcium cyanamide both rose by 13%. Production in Portugal reached nearly 40,000 tonnes/N, compared with 16,000 tonnes. Italian production rose 34% to 546,000 tonnes.

Capacity for nitrogenous fertilisers amounted to 4,295,000 tonnes. Consumption reached nearly 2.8 million tonnes/N, giving a rate of increase of 7% (same), and a slightly lower rate of increase (6%) is forecast for 1959-60. Average consumption per hectare of agricultural land continued to rise slowly to reach 18.2 kg; a figure of 19.4 kg/hectare is forecast for 1959-60, rising to 20.5 in 1960-61.

Consumption of ammonium nitrates kept stable, while consumption both of ammonium sulphate and calcium cyanamide rose by 11%. The largest increases were made in complex fertilisers (in terms of N content) and in 'other nitrogenous fertilisers', consumption rising by 25% and 44% respectively. Ammonium nitrates accounted for a slightly smaller share (38%) of total consumption of nitrogenous fertilisers, while the relative importance of consumption of 'complex fertilisers' continued to increase. They accounted for nearly 17% of the total used last year.

Imports rose 17% to reach 612,000 tonnes. Exports were stable and a marked rise is forecast in 1959-60 and 1960-61, export availabilities are expected to exceed 2 million tonnes in the latter period (1,374,000 tonnes/N in 1958-59).

Net prices for nitrogenous fertilisers decreased in Belgium, Ireland, Italy, Luxembourg, Turkey and the U.K. In France, Iceland and Spain marked increases were made.

Phosphate Fertilisers. After a slower rate of expansion in 1957-58, production of phosphate fertilisers rose fairly rapidly in 1958-59. The increase was general and the expansion in the minor types was the most marked. Production of superphosphates rose by only 3% to reach 1,481,000 tonnes/P_2O_5, and production of basic slag by 1% to reach 1,140,000 tonnes. Output increased in all countries except Luxembourg and Sweden. U.S. production increased by 10% to reach 2.58 million tonnes/P_2O_5.

There was no change in capacity for the production of basic slag and ground phosphate rock and only a small rise in superphosphate capacity. Capacity for the production of other types, such as ammonium phosphate, P_2O_5 in complex fertilisers, etc., rose by 18% to reach nearly 770,000 tonnes, or about 18% of the total capacity for phosphate fertilisers.

Average consumption continued to rise and reached 22.4 kg. per hectare in 1958-59; a figure of 23.7 kg. per hectare is estimated for 1959-60. Highest increases in consumption as a percentage were reported by Turkey (108%), Ireland (23%) and Spain (12%). Consumption pattern changed in favour of concentrated superphosphates, complex and 'other phosphate fertilisers'. Total consumption of those types rose in the O.E.E.C. area by 20%, 14% and 12% respectively, while basic slag consumption declined by 2% over the same period.

FORECASTS OF PRODUCTION

Nitrogenous Fertilisers

Country	1959-60	1960-61
	'000 Tonnes of N	
Austria	164	170
Belgium	320	350
Denmark	—	—
France	610	740
Germany	1,250	1,350
Greece	—	—
Iceland	6	6
Ireland	—	—
Italy	620	650
Netherlands	408	415
Norway	239	239
Portugal	30	30
Spain	95	129
Sweden	38	42
Switzerland	16	16
Turkey	10	10
United Kingdom	400	450
TOTAL	4,206	4,597
United States	2,050	2,050

Imports of phosphate fertilisers, at 438,000 tonnes/P_2O_5, were down slightly, as were exports, at 628,000 tonnes.

Potash Fertilisers. Production rose more rapidly in Germany (by 4.5%) than in France and Spain. Potash output in the U.S. rose 20% to reach 2.1 million tonnes. Production of potassium sulphate and high-grade potassium chloride increased, whereas output of potassium chloride with a lower potash content and crude potash salts was rather below the 1957-58 figure.

Average consumption for the O.E.E.C. area was 20.1 kg. per hectare; a figure of 21.1 kg. per hectare is forecast for 1959-60. Consumption of potassium sulphate, potassium chloride over 45% K_2O and complex fertilisers (in terms of K_2O content) rose by 6.7%, 7.2% and 13% respectively in the O.E.E.C. area, while consumption of potassium chloride (20-45%) and potash salts containing under 20% K_2O, decreased by 5% and 7% respectively. More than half the total potash consumption was in the form of potassium chloride over

PRODUCTION OF NITROGENOUS FERTILISERS

1957-58 (Final Figures) - 1958-59 (Preliminary)

1,000 tonnes of N

Country	Ammonium sulphate		Ammonium nitrates		Sodium nitrate		Calcium nitrate		Calcium cyanamide		Other nitrogenous fertilisers		Content of complex fertilisers		Total	
	1957-58	1958-59	1957-58	1958-59	1957-58	1958-59	1957-58	1958-59	1957-58	1958-59	1957-58	1958-59	1957-58	1958-59	1957-58	1958-59
Austria	35.9	34.3	118.6	113.5	—	—	—	—	—	—	1.6[6]	4.2[6]	1.2	2.2	157.3	154.2
Belgium	128.8	162.3	108.6[4]	111.5[2]	—	—	—	—	8.0	6.4	—	—	14.3[4]	14.9[4]	259.7	295.1
Denmark	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
France	70.5	76.2	281.7	307.6	2.7	2.6	39.3	39.4	2.5	2.0	19.8[6]	23.7[7]	93.5[4]	105.2[8]	510.0	556.7
Germany	223.2	232.8	500.3[10]	454.1[11]	2.3	2.9	47.0	49.9	85.9	101.3	48.5	50.1	140.2	158.9	1,047.4	1,050.0
Greece	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Iceland	—	—	6.5	6.0	—	—	—	—	—	—	—	—	—	—	6.5	6.0
Ireland	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Italy	162.3	227.2	100.5	141.6	—	—	47.6	49.2	25.8	29.7	31.0[1]	40.0[1]	41.5	58.1	408.7	545.8
Luxembourg	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Netherlands	75.9	76.2	224.4	237.1	—	—	25.8	22.7	—	—	—	—	54.2[12]	57.7[12]	380.3	393.7
Norway	—	—	13.2	8.3	—	—	163.6	167.8	2.5	3.5	14.0	18.9	25.6[12]	27.1[14]	218.9	225.6
Portugal	14.4	37.3	—	—	—	—	—	—	1.9	2.4	—	—	—	—	16.3	39.7
Spain	33.7	40.9	15.0	16.1	—	—	—	—	1.0	0.6	—	—	—	—	49.7	57.6
Sweden	1.8	1.4	26.5	25.4	—	—	—	—	5.7	3.9	0.7	0.9	2.2	1.8	36.9	33.4
Switzerland	2.0	2.5	5.0	5.5	—	—	2.6	3.0	1.2	1.5	0.4[1]	0.5[1]	0.8	1.0	12.0	14.0
Turkey	1.2	1.0	—	—	—	—	—	—	—	—	—	—	—	—	1.2	1.0
U.K.	237.1	226.0	73.3	65.0	—	—	—	—	—	—	—	—	36.5[15]	59.0[15]	346.9	350.0
TOTAL	986.8	1,118.1	1,473.6	1,491.7	5.0	5.5	325.9	332.0	134.5	151.3	116.0	138.3	410.0	485.9	3,451.8	3,722.8
U.S.	332.0	331.0	333.0	359.0	— [13]	— [13]	—	—	—	—	1,368.0	1,608.0	108.0	130.0	2,141.0	2,428.0

[1] Urea.
[2] Including 5,427 tonnes of ammonium sulphate nitrate.
[3] Including 4,191 tonnes of ammonium sulphate nitrate.
[4] Including 7,862 tonnes of ammonium phosphate.
[5] Including 7,752 tonnes of ammonium phosphate.
[6] Including 11,745 tonnes of urea.
[7] Including 17,200 tonnes of urea.
[8] Including 2,000 tonnes of ammonium phosphate.
[9] Including 1,000 tonnes of ammonium phosphate.
[10] Including 144,700 tonnes of ammonium sulphate nitrate.
[11] Including 121,300 tonnes of ammonium sulphate nitrate.
[12] Including other nitrogenous fertilisers.
[13] Including 23,400 tonnes of ammonium phosphate nitrate.
[14] Including 23,200 tonnes of ammonium phosphate nitrate.
[15] Included in other nitrogenous fertilisers.

45% K_2O. Potassium chloride with 20-45% K_2O content did not quite reach 30% of total usage, while the K_2O content of complex fertilisers was over 10% of total consumption for the first time.

Imports into the O.E.E.C. area totalled 1,214,000 tonnes/K_2O (1,183,000 tonnes), while exports from the area totalled 1,520,000 tonnes (1,542,000).

Agricultural Lime. Consumption for the O.E.E.C. area totalled 5.8 million tonnes/CaO, or 9% lower than in 1957-58. Consumption is expected to rise by more than 11% in 1959-60. U.S. consumption showed a continued upward trend, 10.3 million tonnes/CaO being used in 1958-59.

I.C.I. Perturbed at Monopolies Report and Release of Cost Figures

GREAT activity in practically all the company's products, despite growing competition from U.S., Continental and U.K. manufacturers, was referred to by Mr. S. P. Chambers, C.B., chairman of Imperial Chemical Industries Ltd. at the annual meeting on 12 May. I.C.I. might have special problems in the Common Market or in other countries with balance of payments problems or political difficulties, but export prospects as a whole remained good.

At home the revival of business in capital goods might to some extent be offset by hesitancy in some branches of durable consumer goods, but so far that hesitancy did not appear to be serious. Any significant increase in credit restrictions could no doubt change the position, so that while in general the outlook was good, the need for vigilance remained. The long-term prospect was one of continued progress.

Capital spending in 1958 and 1959 was lower than in earlier years and expenditure in 1960 would remain below that in the years immediately prior to 1958. The capital spending of one year, however, was largely the result of decisions taken in the two or three previous years and the trend after 1960 was likely to be upwards again. The relatively low levels in 1959 and 1960 had had a welcome effect on the company's cash position.

The final dividend was now as much as two-thirds of the total Ordinary payment. The directors had it in mind to make the interim a larger proportion of the total for the year and no other significance should be attached to any increase that might be made in the interim to be declared in September.

In a reference to the Monopolies Commission report on fertilisers, Mr. Chambers said that it might be that other I.C.I. products would be inquired into by the Commission. He added that the board would face any such inquiry with complete confidence, but they were perturbed by the burden of work (the fertiliser report imposed a strain lasting several years on senior staff members) and by the pressure brought to bear on the company to agree to the publication of information that might be of value to competitors.

"It cannot be too strongly emphasised that the publication of cost figures can give valuable information to our overseas competitors who have not the obligation to disclose to us the corresponding figures of their operations."

It had been concluded that the cost of producing the annual review was out of proportion to its value to stockholders. So far as employee stockholders were concerned, there were other means of disseminating information within I.C.I.

At I.C.I.'s central council meeting, l. to r., S. P. Chambers, C.B., chairman, Dr. R. Holyroyd, F.R.S., a deputy chairman, and Edward Heath, Minister of Labour (see C.A., 14 May, p. 799)

Wills

Mr. Thomas Chadwick, a director of Deanhead Chemical Co. Ltd., who died on 25 February last, left £12,931 net.

MERCK OPEN PHARMACEUTICAL PLANT

Part of 10-Year U.K. Expansion Programme

A NEW three-storey pharmaceutical factory has been opened by Merck Sharp and Dohme Ltd. at Hoddesdon, Herts. Built at a cost of £700,000 in 17 months, it is part of a 10-year expansion programme of the U.K. unit of the Merck Sharp and Dohme International Division. Incorporating many modern features, the building had Holland, Hannen and Cubitts Ltd. as main contractors. The building was planned as a unit of double the present size and the duplicate block will be added as required.

The new plant does not produce chemicals, but draws about 75% by value of its raw materials from Thomas Morson and Sons Ltd., Ponders End, a 136-year-old family business acquired by M.S.D. in 1957. Completion of the new facilities was marked on 17 May by a ceremony at Hoddesdon attended by representatives of the company's British and U.S. associates and of local government and the medical profession.

The five-acre rural site was acquired after the original London premises were destroyed in 1940. The new factory provides better facilities for the full M.S.D. range, including Saluric and Hydrosaluric oral diuretics, Inversine antihypersentive, Hydroderm and other steroids, and Tyrozets antibiotic lozenges. About 30% of production is exported, and the U.K. shipments to the U.S. include chemicals such as nitrates, bromides and iodides, no longer made by the U.S. company, but produced by Morson's.

Gravity-flow

The three-storey building provides gravity flow of materials from the top floor manufacturing area; simple administrative and analytical control of production stages; and economy and flexibility in central 'stacking' of services. Materials handling follows a circular path. Raw materials are received in the loading bays; proceed to a nearby bulk lift for distribution to the manufacturing and packaging floors; traverse the floor via production and packaging lines; and descend on the finished goods lift to the warehouse where they are shipped from the initial loading bays.

The building architecture is in modern style. The curtain walling is of large clear windows with white vitreous enamel sheet steel in full storey panels on precast black edge beams. Space is provided for expansion for the curtain walling on the south side is removable and services piping is already installed to incorporate another building of identical size into a comprehensive unit as a whole.

All utilities of steam, hot water, compressed air, vacuum, demineralised water, fuel store, transformers, etc., are provided by two units. Space and piping connections are provided for the installation of a third unit to supply anticipated needs in the next expansion stage. Steam generating plant is a central oil-fired system of two G.W.B. Powermaster boilers, each rated at 5,275 lb. steam/hour at 100 p.s.i.

General view of the new Hoddesdon plant

All manufacturing areas are designed for fume and dust-free operation. Tablet coating and grinding operations have filtered extract systems, while in other operations the stress is on controlling dust at source. Full air conditioning is provided in many areas; low-humidity conditions for hygroscopic products are maintained by an activated alumina dehumidifier. Temperature control and air filtration are standard in all areas; in addition the sterile department air supply has absolute filtration and u.v. irradiation to reduce the bacterial count.

Each floor has a plant equipment area on the mezzanine that encloses the service core rising in the centre of the building. This 'stacking' of services in the central area provides full use of building headroom, and gives economy of installation and operation.

Production operations are divided into two parts—manufacturing and packaging, on the top and middle floors respectively. Manufacturing consists of the tablet and coating departments, ointments and liquids, sterile and Sucrets departments.

Powders for tabletting are blended in Gardner and Alite mixers. The final blends, consisting of active ingredients and excipients are processed in Manesty mixers. Diluents are added at various stages to convert the powder into a moist mass. The mixture is ground in a Fitzpatrick mill in front of Kunz grinding booths to control dust. The granules are tray-dried in Apex ovens and after drying the granules are ground a second time.

There are seven Manesty compressing machines, ranging in capacity from 5,000 to 83,000 tablets an hour. A Drycoata machine can produce 22,500 press-coated tablets an hour. Each machine is mobile and located in separate cubicles for production control. Most of the tablets are uncoated, but five coating pans, ranging from 36 in. to 60 in. in diameter are used for sugar and cateric coating.

Parentorals are made in two sterile areas. All vials, rubber stoppers and seals are washed repeatedly in demineralised and distilled water. Containers and uniforms pass through an autoclave for sterilisation. All operating personnel enter through a separate series of three dressing, washing and gowning rooms. The products are manufactured, filled and sealed under strict aseptic conditions.

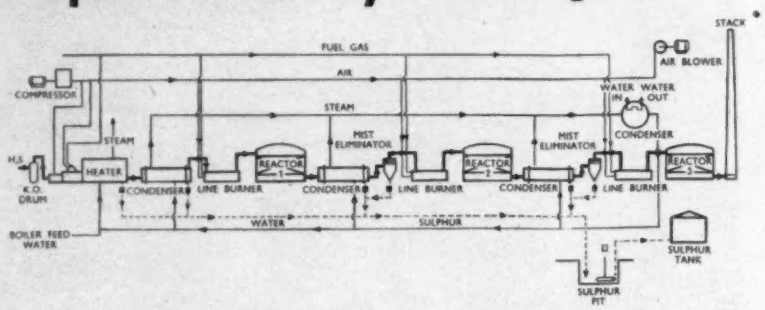
A control department houses a microbiological laboratory and media kitchen where the purity of antibiotics and vitamins is tested; a physical laboratory and balance room, where instruments include a flame photometer and u.v. spectrophotometer; a chemical laboratory where raw materials and finished products are chemically tested by classical volumetric and gravimetric techniques; and a sample store.

Japanese Coal-chemical Specialists Visit U.K.

JAPANESE coal-chemical industry specialists, including leading industrialists, chemists and engineers, visited this country and Western Europe recently, as part of the Japanese Government's policy of expansion and modernisation in the country's tar products industry. The visitors studied such subjects as the co-operative organisation of research, the utilisation of coal tar, and the hydrorefining of benzoles.

A visit was made to the Thornecliffe (Sheffield) works of Newton Chambers and Co. Ltd., where a pilot plant is used for demonstration purposes for the refining of benzoles which is attracting international interest. Originally this demonstration plant was the result of laboratory research work by the Coal Tar Research Association. Newton Chambers hold world rights for making the commercial plants for the process.

New Power-Gas Plant For Sulphur Recovery From H_2S



Flow diagram of the sulphur recovery unit at Altona

RECOVERY of high purity sulphur from hydrogen sulphide, has been practised for about 100 years. The development of this recovery process and the ultimate evolution of the modern technique is described by Mr. J. C. Melbourne, B.E. (Chem.), in *The Power Gas Group Review* for May.

Two new recovery plants have recently been installed by the Group in conjunction with Comprino N.V. of Amsterdam, under license from N.V. De Bataafsche Internationale Petroleum Maatschappij, The Hague. The first, a 67 tons/day unit for Societe Nobel Bozel at Port Jerome in France, started operation in 1958 and the second, a 40 tons/day unit installed at the Altona Refinery of the Standard-Vacuum Refining Co. of Australia Pty. Ltd., has recently gone into operation.

Both plants, utilising a modern form of the Claus Process, work basically on the following reactions:

$$2H_2S + 3O_2 \rightarrow 2H_2O + 2SO_2$$
$$4H_2S + 2SO_2 \rightarrow 4H_2O + 6S$$

$$6H_2S + 3O_2 \rightarrow 6H_2O + 6S$$

the ultimate reaction being exothermic.

A brief description of the Altona plant is given. The hydrogen sulphide is brought to the plant from two sources in the refinery; the removal unit operating on the refinery gas stream and from the newly installed hydro-desulphurisation unit used to remove sulphur from diesel oils and similar products.

As shown in the flow diagram, the feed gas passes through a knockout drum directly to the main burner on the combustion chamber of the heater, where sufficient air is added preferentially to burn all the hydrocarbon gases present and, in addition, one-third of the hydrogen sulphide contained in the gas. The heat thus generated is used to raise high pressure steam (140 p.s.i.) and sulphur formed at this stage is partially condensed and removed. As the gas temperature at the outlet of the heater is still high enough to contain appreciable quantities of sulphur in the vapour phase, the gases are further cooled in a condenser to condense and remove the sulphur prior to the first reactor.

Since the gases have been cooled below the minimum temperature required for reaction, they are heated in the line burner which is fired with fuel gas, the products of combustion passing directly in to the gas stream. The gases then pass to the first catalyst reactor where the hydrogen sulphide and sulphur dioxide react to form sulphur as shown by the equation. The sulphur formed is condensed and removed in a similar manner to that described previously, except that a mist eliminator is included at the condenser outlet to prevent the carry over of entrained sulphur droplets into the next line burner.

The second catalytic stage is the same as the first except that it is carried out at a lower temperature with the aid of a more reactive catalyst, thus increasing the yield of sulphur.

The gases then enter the third line burner where excess air is added and the temperature raised to ensure that the combustion of the remaining hydrogen sulphide will be as complete as possible in the third reactor. The gases then pass directly to the atmosphere via the stack.

The condensation of sulphur from the gas stream poses some problems due to clogging of heat transfer surfaces where liquid sulphur comes into contact with cold metal surfaces. In this case, this has been overcome by constructing the condensers in the form of low pressure steam generators, the steam raised being condensed in a water-cooled condenser and returned in a closed circuit. The entire heat transfer surface is thus maintained at a temperature corresponding to the steam pressure in this system, and under these conditions there is no tendency for blockages to occur in the condenser tubes.

The unit is designed to handle fluctuating loads and, with two interchangeable venturi throats for the main burner, loads from four tons/day minimum to 40 tons/day of sulphur can be handled. Efficient operation depends on supplying the correct amount of air relative to the feed gas to the main burner and maintaining the correct temperatures in the reactors. The air supply is automatically regulated by a ratio flow controller which maintains the air flow in a preselected ratio to the feed gas, thus taking care of fluctuations in feed gas supply. The ratio selected is dependent on the hydrocarbon content of the feed gas and is determined by analysis of its composition performed regularly by the plant operators and checked by the tail gas analyses from the second reactor.

Proportion of hydrogen sulphide to sulphur dioxide in these tail gases should be approximately 2:1 if the correct amount of air is being used. The maintaining of this ratio is the most important feature in obtaining high efficiencies of recovery. The temperature of the reactors is controlled manually by varying the amount of fuel gas burnt in the line burners. Due to the high heat content of the catalyst mass, changes in load do not affect the temperature rapidly and manual control is quite satisfactory.

The unit has demonstrated its capacity to maintain high efficiency under varying conditions of feed gas rate and composition. A typical analysis of the gas composition is:

H_2S	... ...	95% by volume
HC_s	... ...	4.5%
CO_2	... ...	0.5%
		100.0%

With this composition the sulphur produced has been consistently of a purity greater than 99.9%.

Recommended Use of Phosphamidon and Sevin

PHOSPHAMIDON (trade name Dimecron) should be included in the Agriculture (Poisonous Substances) Regulations as a second schedule Part 3 substance and its use on a non-edible crop is acceptable, states the Ministry of Agriculture. There should, it is stated, be a three-week interval between the last application of phosphamidon (2-chloro-2-diethylcarbamoyl-1-methylvinyl dimethyl phosphate) and harvesting of an edible crop.

Providing this is observed, with the recommended application rates, the use of phosphamidon on apples, sugar beet, mangolds and fodder beet should present no hazard to consumers. Animals and poultry should be kept away from the spray and from sprayed areas for at least two weeks; spraying should be avoided when fruit or crops are in flower and care should be taken not to contaminate neighbouring crops, ponds, etc.

Sevin (1-naphthyl *N*-methylcarbamate) need not be included in the regulations. Operators should avoid contact of the concentrate with the skin. Given a 7-day interval between application and harvesting, its use on apples and pears should present no hazard to consumers. Similar care in spraying should be taken as with phosphamidon.

Milk and Products Report Issued

The 1959 report of the Milk and Milk Products Technical Advisory Committee, including a brief summary of the first five years' work of the committee, has now been issued. Copies may be obtained from the joint secretaries of the committee, Ministry of Agriculture, Fisheries and Food, Great Westminster House, Horseferry Road, London S.W.1.

I.E.A. EXHIBITION

Preview of Exhibits for Chemical and Allied Industries

OCCUPYING twice the floor space of its predecessors, the International Instruments, Electronics and Automation Exhibition opening at Olympia, London on 23 May, will house the products of almost 500 exhibitors, nearly 100 of them from overseas.

Third show of its kind staged in this country, the exhibition, to be opened by Lord Mills, K.B.E., Paymaster General and former Minister of Power, will run until 28 May.

A special CHEMICAL AGE preview of the exhibition, with emphasis on equipment of particular interest to the chemical and allied industries, is published below:

New A.E.I. Recorders

A new D.C. potentiometric recorder with 4 in. chart multi-colour printing and numerous attractive design features will be among items shown by process components department, **Instrumentation Division of Associated Electrical Industries Ltd.,** Aldwych, London W.C.2.

Other new items will include the potentiometric indicator/controller, a continuously self-balancing instrument whose speed is such that the whole length of the scale, 25 in., can be traversed in 2 secs. Also on show for the first time will be a flow recorder, a pneumatic instrument combining a 12 in. circular-chart recorder with the well-known Barton differential pressure unit. This recorder, which can be used on almost any process including noxious gas or corrosive fluid, will be used for a linearised flow demonstration.

Portable pH Meter

Described as a new, revolutionary concept in pH instrumentation—the Model 700 big scale pH Meter, by **Analytical Measurements Ltd.,** Dome Buildings, the Quadrant, Richmond, Surrey, making it simple to read pH values within .02 pH. Easily portable (it weighs 5 lb.), the model can be used wherever a standard A.C. voltage outlet is available.

The originally designed polythene electrode probe unit permits the user to 'bring the meter to the sample—not the sample to the meter'. It is complete with buffer and KCl solutions, and temperature compensation is provided.

B.T.L. Exhibits

The exhibits of **Baird and Tatlock Ltd.,** 14/17 St. Cross Street, London E.C.1, will be divided into three sections: the latest developments in analmatic equipment for automation in analysis, new and established general laboratory instruments, and W. B. Nicholson instruments for school science.

The auto-titration equipment is now available in two main types, differing primarily in methods of dispensing the titrant and measuring volume used.

The new B.T.L. laboratory autoclaves will be seen for the first time, and the range has been completely redesigned to bring it into line with current practice and requirements. The new Bara Autoclaves are available in vertical or horizontal form, in three sizes, and heated by gas or electricity. Two new autoclaves conforming to B.S. 2646: 1955, one gas heated and the other electrically heated will be shown.

Rigid Stem Thermometers

A comprehensive range of dial thermometers, recorders and controllers will be shown by the **British Rototherm Co. Ltd.,** Merton Abbey, London S.W.19.

Rigid stem thermometers with dial sizes from 1 in. to 7 in. in a wide variety of temperature ranges, presentations, stem lengths and diameters, max./min. and control alarm thermometers, also rotostat cartridge type thermostat for engine bearings will be displayed with special designs for diesel engines, petroleum, chemical and most industrial applications.

Temperature Recorder

The multi-point feed water recorder-analyser by **Cambridge Instruments Co. Ltd.,** 13 Grosvenor Place, London S.W.1 is an outstanding example of the latest development in instrumentation for high pressure/high temperature boiler systems. Five separate feed water variables are measured and recorded by a single instrument: dissolved oxygen, dissolved hydrogen, residual hydrazine, pH and electrical conductivity. The analysing and measuring elements are housed in cabinet 6 ft. high by 4 ft. by 2 ft.

The Cambridge Minican temperature recorder to be shown is a pocket size, self-contained instrument for use in confined spaces; e.g. recording the temperature inside a tin or bottle passing through a conveyor oven or similar process. The 40 mm. chart is mounted on a small clockwork driven drum, which revolves at a constant speed, for two hours, 12 hours, or 24 hours. A stylus moved by an expansion system, traces the temperature record to an accuracy of 0.5 mm. of the chart width. Suitable for temperatures of −30° to +160°, with a minimum span of 50°C, it is liquid and gas proof and can be subjected to pressures of up to 30 p.s.i.

Thermostatic Circulator Unit

Featured among the exhibits of **Camlab (Glass) Ltd.,** 50 Burleigh Street, Cambridge, are the Colora thermostatic circulation units giving a temperature control of up to and including 0.01°C over a range of −50°C to 150°C.

Also shown will be magnetic stirrers, special designs of which can be manufactured to order; the Camlab thermostatic oven, of improved design in a full range of sizes and specifications; centrifuges of various patterns, and thermostatic baths. These latter cover not only the normal range to a precision of over .25°C or .005°C but also a low temperature bath with a range of −25°C to 65°C.

D.S.I.R. Stand

Among the 25 new instruments and measuring techniques to be featured on the stand of the **Department of Scientific and Industrial Research,** Charles House, 5-11 Regent Street, London S.W.1, is a radioactive rotameter from the Warren Spring Laboratory.

It is difficult to use conventional methods for detecting the position of a rotameter float when measuring low rates of flow at high pressures. In the new method to be shown a radioactive float in a glass or metal tube is used and its position detected by a number of Geiger tubes mounted in the housing surrounding a length of the tube.

A venturi pneumatic pyrometer from the **British Coal Utilisation Research Association** will be shown, giving almost instantaneous readings of gas temperatures in industrial furnaces, including those which are too high for suction pyrometers or accompanied by too much fume and slag for the suction type to have an appreciable life. It has been used for temperatures up to 2,200°C and there is no reason why, with suitable precautions, it should not be used for even higher temperatures.

Electrothermal Engineering

A range of laboratory and industrial heating equipment and scientific instruments will be exhibited by **Electrothermal Engineering Ltd.,** 270 Neville Road, London E.7, including heating mantles, electric bunsen, distillation and extraction apparatus, Kjeldahl apparatus, melting point apparatus, precision brazing equipment, glass tube cutter and immersion heaters.

The surface heater range (armoured heaters, pipe heaters, heating tapes, thermocord, heat-by-the-yard and flexible furnace), has been extended to include industrial heating tapes capable of operating up to 1,000°C.

Hydrogen Purifier

One of the main sections of the stand of **Electronic Instruments Ltd.,** Richmond, Surrey, will be the now well-known E.I.L. pH centre expanded with a number of new instruments. The centre will show an extremely wide range of pH meters for use in research, education, industrial development and control.

The Serfass hydrogen purifier will be shown. It enables hydrogen to be produced at such a high standard of purity that any impurities which may remain, cannot be detected by any present known method. The water-treatment

section will demonstrate four colorimetric techniques by automatic chemical analysis instruments for the treatment of water.

Control Equipment

Three stands will be occupied by **Elliott-Automation Ltd.**, 34 Portland Place, London W.1. A complete Panellit 609 industrial information system will be shown which incorporates as its central controlling unit, an Elliott 803 digital computer.

Also of interest is a working demonstration of the Optimat optimising control unit. It will be shown controlling the operation of an oil distillation column which is being simulated by an Elliott G-PAC Mk. II. The Quality Control Division is exhibiting a moisture monitor, leak detection equipment and an infra-red analyser.

The industrial weighing activities of Elliott Brothers are represented by a working model of a constant weigh feeder and a range of load cells, while automation in process control is represented by displays from Electroflo Meters Co. Ltd., James Gordon and Co. Ltd., and the Process Control Divisions of Elliott Brothers (London) Ltd.

E.E.L. Instruments

The E.E.L. spectra will be shown by **Evans Electroselenium Ltd.**, Halstead, Essex. This instrument "combines the simplicity and convenience of routine

EEL spectra

colorimetric units with the versatility and high performance needed for research". It incorporates a continuous interference spectrum wedge of high quality, which is operated from a control on the front panel, giving ease of wavelength selection over the range 400-700 mμ. Samples are contained in either fused glass cells or test tubes, and facilities are provided for the ready checking of test or 'blank' solutions. A sealed-in galvanometer, protected against coil stiction and loss of linearity, provides readings on a clearly defined 15 cm. scale.

Other instruments on display include flame photometer, titrator, fluorimeter, sedimentometer, nephelometer head.

Evershed Exhibits

There are a number of additions to the range of process control equipment by **Evershed and Vignoles Ltd.**, Acton Lane, London W.4. The company's precise tank gauge, widely used in petrochemical industries throughout the world, is shown together with its complementary equipment, the tank average-temperature gauge. The precise tank gauge, the metric version of which is manufactured by the associated company, Evershed-Enraf, is now certified for customs use in Germany and many other European countries, is accurate to 1 mm. over the whole of its measuring range of 60 ft. Explosion-proof versions and gauges wtih an interface facility are also available.

A new level indicator for fine granular solids is shown. This transmitter is arranged as a live exhibit. Also a new transmitting resistance thermometer is to be shown which generates an output signal suitable for indication and/or recording or for direct application to an Evershed Mark 4 process controller.

Electronic Control System

Two new developments by **Fielden Electronics Ltd.**, Wythenshawe, Manchester, will be on display. These are the Bikini range of temperature indicators, recorders and controllers and their new electronic control system.

The Bikini range are inexpensive transistorised instruments designed to operate with resistance bulbs. They provide the accuracy normally associated with much more expensive instruments, and their simple design "gives even greater reliability". A completely sealed unit will be featured providing on/off temperature control action. The instrument can be located up to 300 ft. from the measuring point without affecting calibration. It is available in many centigrade or fahrenheit ranges and with suppressed zero.

Another completely sealed unit "requiring no maintenance" is the indicator. This is a self-balancing instrument and can be fitted with a control contact.

Tank Contents Gauges

Exhibited by **Firth Cleveland Instruments Ltd.**, Treforest, Glamorgan, will be the Gilbarco-Firth Cleveland electronic tank contents gauge, manufactured under licence from the Gilbert and Barker Manufacturing Co., of America. This will measure liquid levels to an accuracy in the field of within 1/16 in., or in a laboratory within 1/64 in. (Orders for this equipment have recently been received from two major oil companies.)

New also is a number of level detectors and controllers for use with liquids or granular solids. In the electrical instruments, all employ transistor circuits and the latest constructional techniques. Believed to be unique is a level detector consisting of a stainless steel vibrating probe, oscillation of which is damped by contact with a liquid or semi-solid (even with very low density granular materials), suppression of oscillation being used to operate a relay.

Magnetic Flowmeter

The magnetic flowmeter and differential pressure transmitter by **Fischer and Porter Ltd.**, Workington, Cumberland, will be on show for the first time. Other new instruments on show this year for the first time include the Model 2235 Ratosight indicator and alarm, the series 1200 Bulls Eye flow indicators. The recent relaxation of import restrictions has made it possible for the company to offer four new secondary instruments of American and Dutch origin at competitive prices in this country and the four exhibits in this category are miniature recorder, two term controller, drum indicator, and the company's digital demand recorder.

Also on show on stand A10 is the complete range of flowrators, the standard glass tube variable area indicating flowrators are shown with a full range of accessories and there will be three flow test kits of interest to laboratory people.

Temperature Measurement

A company with 50 years in the field of temperature measurement, celebrating their Golden Jubilee this year, is the **Foster Instrument Co. Ltd.**, Letchworth,

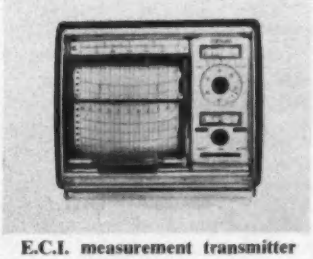
Temperature control recorder

Herts. They will have on display a new instrument of compact size (panel cut 6 in. by 12 in.) for application requiring a simple but reliable method of temperature control.

The self-setting Teloscale, a development of the well-known instrument, will be shown, in which a visible portion of the scale is automatically reset in accordance with temperature readings. The self-setting instrument allows easy measurement of the temperature of several different metals, either at one point or at widely different measuring points.

Measurement Transmitters

A completely new range of E.C.I. measurement transmitters, recorders and controllers for flow, pressure, temperature will be shown by **Foxboro-Yoxall Ltd.**, Redhill, Surrey. Using transistorised and magnetic amplifier designs to provide 100% solid state electronic construction, the two controller types are the universal controller, transistorised, with fully adjustable controller settings; the flow controller, magnetic amplifier, with controller settings fixed at optimum values. Other new products include the M/44 series of motion-balance pneumatic



E.C.I. measurement transmitter

transmitters for temperature, pressure, humidity, etc.; and the 11A target flow transmitter, a pneumatic force balance system, with circular disc located centrally in a pipe section.

Griffin and George

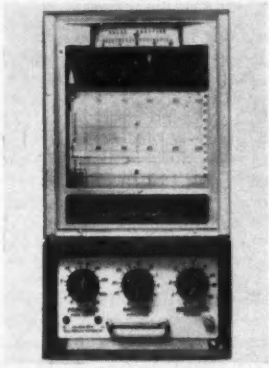
A wide range of scientific equipment for educational, research and industrial laboratories and control will be displayed on the stand of **Griffin and George Ltd.**, Ealing Road, Alperton, Wembley, Middlesex.

Besides the manufactures of the various companies of the group, there will be exhibits from French, West German, Finnish and other foreign scientific equipment manufacturers for whom Griffin and George act as British or international selling agents.

The latest units of the Griffin equipment for gas chromatography will be among the various types of equipment to be demonstrated.

Honeywell Controls

"A major step forward in instrument design" is shown on the stand of **Honeywell Controls Ltd.**, 1 Clement's Inn, Strand, London W.C.2. It is the new



New modular ElectroniK design

Modular ElectroniK design embodying four self-contained and easily removable sub-assemblies as a standard feature. The chief benefits are easier servicing, lower maintenance costs and higher accuracy. Most interest will be aroused by the constant voltage unit "which does away with periodic standardising and battery replacement". The new modular concept is applied to Honeywell's indicators, recorders and controllers.

Newly introduced are some less sophisticated control devices for controlling temperature, pressure, liquid level, and other variables. This tough range, mainly of the non-indicating type, has been specially developed for industry.

Miniature Pump

Among the equipment to be displayed by **Kelvin Hughes (Industrial) Ltd.**, Livingstone College, Knotts Green, Leyton E.10, is a miniature pump designed initially to replace the venturi sampling of flue gases in the company's CO_2 sampling system. It is considered likely that this pump, by virtue of its design features, will find a large field of application in the chemical industry.

No contact is made with the process gas or fluid, thus corrosives and sterile liquids, photographic processing liquids, etc., are obvious applications.

An experimental model shown at the Physical Society Exhibition was rated in 200 cc./min. and was a twin line totally enclosed model, provided with push-on nylon connectors. Production models will, however, cover a wide range of ratings, etc.

A comprehensive range of temperature controllers will be shown, all incorporating the sensitive galvanometer-type measuring system developed by the company.

New Pressure Transducer

A new transducer for measuring steady and fluctuating pressures up to a maximum of 20,000 p.s.i. will be seen on the stand of **J. Langham Thompson Ltd.**, 176 High Road, Bushey Heath, Herts. Smaller than its predecessor, Model BP3 incorporates all the experience gained over many years of specialisation in this class of product. The sensing element consists of a beryllium copper cylinder and a 4-arm strain gauge bridge network.

"The excellent high frequency response of this transducer makes possible the investigation of transients in pneumatic and hydraulic systems," and it may be used with all such fluids as are compatible with beryllium copper, but when non-compatible corrosive fluids are present, an all stainless steel version of this transducer, known as BP6, should be used.

Fire Prevention

The stand of the **Minerva Detector Co. Ltd.**, Lower Mortlake Road, Richmond, Surrey, will be equipped with three complete installations of the company's fire detection system, illustrating its application to the protection of buildings and of individual items of industrial and technical equipment.

The Minerva detector has as its sensitive element an ionisation chamber which responds to the presence of extremely small traces of the combustion products which are given off when any smouldering or burning starts.

Also demonstrated will be a Minerva control unit specially designed for incorporation in racks of process control or electrical or electronic equipment which are left running unattended for long periods. This fire prevention unit "fails safe", so that the equipment under guard cannot be brought into circuit unless the fire detection system is operating.

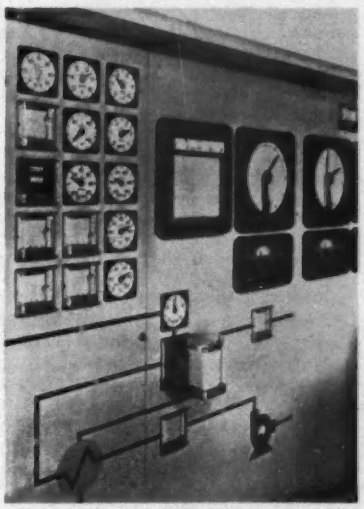
Data Processing System

Prominent on the stand of the **Plessey Co. Ltd.**, Ilford, Essex, will be the section devoted to its associate company, **Hagan Controls Ltd.** Featured will be the Hagan Kybernetes data processing system, an automatic data scanning and computing system capable of continuously sampling a large number of primary and secondary plant measurements enabling an operator to take appropriate action in control of the process. It is possible for a plant to become almost entirely self-operating when the Kybernetes computing system is linked with conventional controllers.

Also appearing on the stand will be representative selections from the range of Hagan control equipment.

Italian Control Equipment

A complete and comprehensive range of industrial control and instrumentation equipment designed in Milan by the



A panel of Unibloc instruments

Guardigli Company is being shown for the first time in this country by **R. B. Pullin and Co. Ltd.**, Phoenix Works, Great West Road, Brentford, Middlesex.

The equipment comprises Unibloc and electronic potentiometric ranges of instruments for the measurement, recording and control of temperature, pressure, flow, density, level, pH and salinity. Complete systems are available controlling all types of industrial processes involving the above functions, including the control of boilers and furnaces.

The electronic potentiometric range of instruments is used for the measurement and control of temperature, and other functions involving the use of sensing elements providing a low level signal output.

Three-Dimensional Television

Three-dimensional television for use in industry will be shown by **Pye Ltd.**, of Cambridge. This new 3-D system—particularly useful for remote observation, control and manipulation of materials and processes—can be attached to any existing closed-circuit TV installation.

"This is the first time in Britain that a 3-D television picture has been made possible when using only one chain of closed-circuit TV equipment." A Pye master slave manipulator can be used in conjunction with the new equipment for remote handling. The operator, having stereoscopic vision, can pick up any article by remote control.

Other exhibits by the Pye Instrument Group include the argon chromatograph.

Quickfit and Quartz

A comprehensive range of scientific and laboratory glassware for use in industrial, research and teaching establish-

ments will be shown by **Quickfit and Quartz Ltd.**, Stone, Staffs.

The exhibit will include open-necked reaction vessels from experimental size (700 ml) to small production size (20 litre), incorporating wide-bore flat-flange connections between flasks and lids, to facilitate the cleaning. All flasks and lids are fully interchangeable. Also on show will be Kjeldahl apparatus for nitrogen determination, including a new assembly devised by J. Leurquin in which small quantities can be accurately estimated without the use of steam.

Finally, all types of extraction apparatus will be shown with a new 'cold' soxhlet extractor of 60 ml nominal syphoning capacity and new additions to the standard range of soxhlet extraction assemblies to include extractors of 4 ml, 25 ml. 600 ml and 2 litre nominal capacity.

Fluid Measurement Control

A display of fluid measurement and control apparatus manufactured by **Rotameter Manufacturing Co. Ltd.**, 330 Purley Way, Croydon, Surrey, will be on view. This will include a new pattern of purge flow indicator suitable for panel mounting, available also as a piped-up unit with a differential pressure regulator. The metric series of standardised glass tube Rotameters offer interchangeable tubes and floats to cover a range of flows from .1-200 litres/minute of water or 1-2,000 litres/minute of free air.

Three types of float cover most applications. Type 'A' of anodised duralumin for air and non-corrosive gases; type 'S' of stainless steel (18:8:3Mo) for general purpose liquid flow measurement, and type 'K' of korannite (a ceramic material of similar corrosion resistance to borosilicate glass), for highly corrosive gases and liquids. Also to be shown are floats made of aluminous porcelain, a particularly robust material for corrosive service.

The 'R.M.' continuous weighing density meter for liquids and slurries will also be shown.

Valve Actuator Equipment

Designed specifically for incorporation in process control systems utilising electrical signalling, and to give a performance superior to pneumatic systems, is the electro-hydraulic valve actuator by **Wilmot Breeden Co. Ltd.**, Amington Road, Birmingham 25.

It is a self-contained unit powered by standard electrical supplies, accepting d.c. signals direct from controller without further amplification. Control signals of 0 to 5 mA and 0 to 15 mA are standard but other ranges can be accepted if desired.

Plastics Laboratory Equipment

Principal exhibit of **X-Lon Products Ltd.**, 48 Gillingham Street, London S.W.1, will be plastic equipment for laboratories and chemical plant.

Polypropylene has been adopted for much of the equipment, where its fine finish and excellent temperature resistance up to 140°C have given it advantages over older forms of polythene. Being more transparent than polythene, it is particularly useful for measuring cylinders and beakers, since the levels of the liquids can be clearly seen through its walls.

One particular new development is a controlled temperature bath in which the heat is supplied by a graphite coated epoxy resin electric element which is embedded in the polyester glass fibre body of the bath itself. The important, and recently patented, principle involved has "a host of potential applications to many industries other than the photographic", for which the exhibit has been designed.

Time Proportioning Control

Two types of time-proportioning controller by **Sifam Electrical Instruments Co. Ltd.**, Higher Lincombe Road, Torquay, Devon, are to be displayed; one a normal on/off model, and the other a proportioning amplifier, larger than the first named.

The on/off type embodies a single pole over switch energised below set point and de-energised at set point, for use where controlled conditions must be accurately maintained. Action is such that the rate on 'off' to 'on' time is continuously varied depending on instantaneous temperature.

New Single-Pan Balance

A representative selection of balances will be shown from the range of **Stanton Instruments Ltd.**, 119 Oxford Street, London W.1, manufacturers of precision and analytical balances and weights.

The new Unimatic single-pan balance will be on general view for the first time in this country. In outward appearance identical to the Ultramatic balance and incorporating all the advantageous features of that model, the new balance has been evolved to weigh on the constant load principle.

The Stanton thermo balance comprises a standard air-damped analytical balance, a furnace mounted above, and a recording chart on which time, weight and temperature are simultaneously recorded up to 1,000°C on the standard models, or 1,400°C on the high temperature models, for periods up to several days.

Auto-Analyzer System

On show by **Technicon Instruments Co. Ltd.**, 26 Warwick Road, S.W.3, will be working models of their Auto-Analyzer system. It is "the world's first and only continuous automatic wet chemical analyser—a robot chemist performing complete chemical analyses either in the laboratory or in the plant."

The principle on which the instrument functions is one of analysis through a continuous and dynamic flowing reagent system. Within this system the sample is continuously withdrawn from the sampling stream, or sample point, and the appropriate reagents are in a state of continuous proportional confluence, such that the difference between the reagent blank and the sample is continuously measured and recorded.

Visual Colour Measuring

A new design of the Lovibond Schofield apparatus will be demonstrated by **Tintometer Ltd.**, Waterloo Road, Salisbury, Wilts. This instrument enables readings using the Lovibond primaries, red, yellow and blue, to be converted instantly to the x, y, z values of the C.I.E. international system.

Also on show will be the Lovibond comparators and discs of permanently coloured glass standards.

Pressure Recorders

Main display of **Walker Crosweller and Co. Ltd.**, Cheltenham, will include the range of Arkon Model 1600 pressure and vacuum recorders and Model 1601 gas flow recorders. A relative newcomer to the Arkon range is the Model 1602 flow recorder for high pressure gas, compressed air, steam, water, etc. Remote reading versions will be on view.

A working display incorporating the V-notch liquid flow recorder will be of particular interest to visitors concerned with effluent disposal. Portable instruments will include a most sensitive gas flow recorder for use with a pitot tube.

Modified Pneumerstat Unit

Following a recent development **Williams and James (Engineers) Ltd.**, Chequers Bridge, Gloucester, have introduced a modified version of their Pneumerstat unit, an inexpensive proportional controller for liquid level "with high stability and sensitivity".

The modified instrument is a simple pressure amplifier with adjustable sensitivity, stability being expressed in terms of output pressure better than plus or minus ¼ p.s.i. The two types are: fixed level, non-adjustable; and adjustable, the latter capable of indicating level in feet depth on a suitable calibrated indicator.

Newly designed Lovibond Schofield apparatus

Optimum Use of Distillation Columns Would Give Big Cost Savings says L. Holliday

RESEARCH work in the field of distillation which is being sponsored by the Association of British Chemical Manufacturers and the British Chemical Plant Manufacturers' Association was referred to by Mr. L. Holliday, chairman of the A.B.C.M./B.C.P.M.A. distillation panel, when he concluded the proceedings at the recent international symposium on distillation. Sponsored by the Institution of Chemical Engineers and the Chemical Engineering Group, Society of Chemical Industry, and held under the auspices of the European Federation of Chemical Engineers, the symposium attracted an attendance of 600 from 15 countries (see also CHEMICAL AGE, 7 May, p. 765).

Mr. Holliday said that under the research programme which had been under way for 18 months, six projects were being studied.

U.S. Research Programme

A major programme in distillation research, on slightly different, lines, had been sponsored over the past few years by the American Institution of Chemical Engineers. It could be expected that both programmes, with the symposium, would serve to advance knowledge of distillation significantly, declared Mr. Holliday.

He said some may have thought it strange that some subjects had been omitted from the symposium—little or no mention had been made of methods of calculating theoretical trays; no mention had been made of capacity calculations and correlations, such as pressure drops, etc., there had been little or no mention of specialised techniques, such as molecular distillation. That was deliberate; the intention was to concentrate on those areas where ignorance was greatest.

Distillation, however, was a field where there was already a great deal of knowledge; the statement that throughout the world distillation columns were processing a total of 200 million tons a year of liquids of all kinds was proof of that. In fact, practice had outstripped theory as it often did in technology.

It was true that for 95% of industrial problems, a chemical engineer could produce a reasonable design for a distillation column. It would rarely to optimum—the column would usually be somewhat overdesigned, or less commonly, underdesigned—and would usually cost more than it should, but it would work. If followed, therefore that if no advance were to be made in distillation theory and practice, it would still be possible to cope with the majority of industrial problems that would arise in the future.

There was, therefore, an economic incentive to learn more about distillation. If all the 200 million tons/year now being distilled were distilled in equipment of optimum design, there would be a considerable saving of capital and operating costs. That alone would justify further research, but in Mr. Holliday's opinion that was not the only, nor even the most important justification.

The major justification was basic curiosity—to know why things happened. "The fact is," he added, "that we do not know the answer to some of the simplest questions in distillation." What was the mechanism, or mechanisms, by which matter was transferred from the vapour to the liquid phase and vice-versa, in a distillation column, and what was the surface area across which the matter was transferred? Did that interface present any resistance to mass transfer?

It was significant that the papers dealing with the question 'how' had come from industry, that was the papers on tray and column design and capacity, stemming from research of a strictly practical nature. That was the research most likely to yield a quick financial return. Papers dealing with the question 'why', had come in the main from universities, and long-term, it was from the universities that the greatest and most important advances could be expected.

High Standard

The papers had all been of a very high standard and the proceedings of the symposium would continue, for a long time, to be "the most up-to-date and complete statement of our knowledge of distillation". The symposium had revealed that workers in Europe were making important advances. The two papers from the U.S.S.R. had been particularly welcome, and had illustrated the high standard of chemical engineering research in that country.

Dealing with some of the highlights that had emerged, Mr. Holliday referred to the field of mass transfer first. The two-film theory which had served well in the past, continued to be the model by which the experimental data was interpreted. It gave a simple physical picture of how the resistances on the two sides of the interface operate. He was convinced that a desire to have a mental picture of mass transfer processes in terms of a razor sharp interface offering no resistance, and a gas and a liquid film where the resistance was centred, was beginning to hold up progress. In order to explain the behaviour of distillation columns over a wide range of operating conditions, they had to make the two-film theory more and more sophisticated and less and less general. It was now time to draw back a little and make a fresh approach.

Danckwerts and his colleagues had drawn attention to the fact that it was wrong to ignore the effects of thermal distillation. They pointed out that thermal distillation would be more important in the case of easy separations and less important in the case of difficult separations.

Haselden had produced some interesting information on ammonia-water separations, and in particular had shown again that plate efficiency could be strongly influenced by concentration. The outstanding work of Calderbank had added greatly to knowledge of interfacial area, in the field of distillation. The liquid mass transfer coefficients which he had obtained could be explained by the simplest physical model, since they were independent of turbulence and were only influenced by molecular diffusivity and viscosity. It had been questioned whether that applied to realistic loading conditions. It had been pointed out by Garner that molecular diffusion alone could not always explain the extent of mass transfer through the gas film, and it was necessary to postulate much higher effective diffusivities in order to explain the latest work of the American Institution of Chemical Engineers.

Support from Haselden

In support of that, Haselden pointed out the simple fact that in a typical experiment, 25% of the vapour stream was transferred to the liquid and vice versa in a contact time of 0.5 sec. This could hardly be explained by simple molecular diffusion.

The interesting paper of Professor Kafarov showed that at high loading conditions in a packed column, the liquid and gas film coefficients were very dependent on the dynamic state of the surface and the molecular characteristics were not important. That was supported by the very high efficiencies which Kafarov had obtained in packed columns.

Summarising the papers on mass transfer, it seemed to Mr. Holliday that they were on the point of making a breakthrough as the result of the accumulation of new data which was flooding in from all over the world. He also detected from the meeting a growing suspicion of data collected under artificial conditions, such as the use of air-water systems, the only merit of which was that they were easy to handle.

Turning to the papers on vapour-liquid equilibrium, those included a most excellent review by Professors Ellis and Bourne. It offered advice on how the various standard equations should be used, and what were their limitations. It appeared from their paper that more work on highly non-ideal systems was needed. Since there was an abundance of experimental data available, the problem required a renewed theoretical attack, which had been started at Birmingham. The paper on vapour-liquid equilibrium from India had provided further experimental support for the method of Werner Kuhn for the prediction of azeotropes, and the method of Reed for the prediction of azeotropic temperatures.

New Production Method Leads to Novel I.C.I. Vat Dyes

PRODUCTION of a new grain form of vat dyestuffs has been made possible, state the I.C.I. Dyestuffs Division by the use of a unique manufacturing techniqe. The FDN Caledon grains, as the new brands are called, are intended to supplement the series of SQ Caledon grains, which were introduced some 15 months ago. The new FDN Caledon grains are said to be ideal for all orthodox leuco-dyeing processes, and for the dyeing of piece goods by all pre-pigmentation methods where drying between pigmentation and reduction is not required.

The excellent stability of dispersions of FDN Caledon grains enables them to be applied to yarn packages by a shortened pre-pigmentation process developed by I.C.I. In this, the very fine physical form of the dispersed dye results in very uniform pigmentation and rapid establishment of equilibrium between the dye in the liquor and the dye in the packages, dyeing being completed, following the addition of the reducing agents, as in normal leuco dyeing.

This shortened pre-pigmentation route may be used to replace package dyeing systems in which a pigment exhaustion stage precedes reduction. Where, however, it is still desired to operate a pigment exhaustion technique, it will usually be necessary to employ either SQ Caledon grains or the FD Caledon powder fine brands, since the new FDN Caledon grains show negligible tendency to give pigment exhaustion on using the usual expedients of raising the temperature and adding electrolytes.

An initial range of six FDN Caledon grain brands—of some of the more important members of the Caledon range—is being marketed, but it is intended to extend the range in the future. The initial six, however, cover a wide shade range and will cater for a high percentage of current requirements. The advantages of the new brands over the ordinary powder fine brands—in cleanliness, ease of handling and virtual absence of any tendency to dust or fly—represent additional inducements to dyers anxious to take advantage of their outstanding dispersing power and stability.

The initial six vat dyes available in the new range are Caledon dark brown 6R, Caledon brilliant red 3B, Caledon blue XRC, Caledon olive green B, Caledon jade green XBN and Caledon direct black AC.

Consultant Answers Complaints on Warrington Hydrogen Peroxide Plant

WARRINGTON and Runcorn councillors and others were invited by Laporte Chemicals Ltd. to a conference to hear and discuss a report by Mr. W. A. Damon, an independent consultant, on complaints about objectionable fumes emanating from the hydrogen peroxide plant at the Baronet Works.

Mr. Damon who had visited the works and studied the processes, said the main operation involved the circulation of large quantities of a mixture of two organic solvents. It would be useless to pretend that this material could be pumped continuously day and night through the plant without any loss to atmosphere. There were bound to be small leakages from pump glands and pipe joints. His conclusions were:

Many of the complaints last summer related to air pollution for which Baronet Works was not and could not be responsible. Baronet Works produced no hydrogen sulphide and no sulphur dioxide except that produced by the combustion of coal which was discharged in dilute form with the waste gases from the boilerhouse.

Works operations result in a discharge to atmosphere of small quantities of solvent vapours. Under normal conditions, the odour, therefore, is not noticeable, but occasionally in unfavourable meteorological conditions and for short periods it may be detectable in down wind locations.

Even in such unfavourable conditions, the concentration of vapour in the atmosphere is below that which could conceivably cause damage to health, vegetation, fabrics or property.

The sources of solvent vapour emissions have been pinpointed and steps which have been, and are being taken, will, in his opinion, result in progressively improved conditions.

Two New Pigments from Johnson Matthey

Two new pigments, Matthey titanate yellow and Hatton green have been introduced by Johnson Matthey and Co. Ltd. Both colours are said to possess excellent light fastness in full shade and in reduction as well as outstanding chemical resistance. Their thermal stabilities are greater than those of other pigments of comparable colour.

While both colours are suitable for general use in the surface coating and plastics industries, it is expected that they will find particular application in the formulation of stoving enamels, alkali resistant paints, cement finishes and emulsion paints for interior or exterior use.

Further information on the physical characteristics of typical batches of both pigments is available from the company at 73-83 Hatton Garden, London E.C.1.

Phenethicillin is One of New Approved B.P.C. Names

PHENETHICILLIN is the approved name given by the British Pharmacopœia Commission to 6-(α-phenoxypropionamido)penicillanic acid and (1-phenoxyethyl) penicillin; Broxil is the potassium salt. It is pointed out that the issue of an approved name does not imply that the substance will necessarily be included in the British Pharmacopœia or that the Commission is prepared to recommend the use of the substance in medicine.

In the following list, the approved name is followed by chemical names and in some instances by names applied to preparations of the substance; they also include some registered trade marks:

Amphotericin: polyene antibiotics isolated from a strain of a *Sterptomyces* species, referred to as *Streptomyces nodosus*: fungizone is Amphotericin B.
Benzonatate: 2- (ω-methoxypolyethyleneoxy) ethyl p-butylamino-benzoate; Tessalon.
Benzthiazide: 3- benzylthiomethyl- 6- chloro- 7- sulphamoylbenzo- 1:2:4- thiadiazine 1:1- dioxide; Fovane.
Chlormidazole: 1- p- chlorobenzyl- 2- methylbenzimidazole.
Chlorzoxazone: 5- Chlorobenzoxazolin- 2- one.
Cinnarizine: 1- *trans*- cinnamy- 4- diphenylmethylpiperazine.
Diethylpropion: α- diethylaminopropiophenone; tenuate is the hydrochloride.
Guanethidine: 1- (2- guanidinoethyl) azacyclooctane; Ismelin is the sulphate.
Itramin tosylate: 2- nitratoethylamine toluene-p- sulphonate; nilatil.
Methandienone: 17β- hydroxy- 17α- methylandrosta- 1:4- dien- 3- one Dianabol.
Methdilazine: 10- (1- methyl- 3- pyrrolidinylmethyl) phenothiazine.
Metronidazole: 1- (2- hydroxyethyl)- 2- methyl- 5- nitroimidazole; Flagyl.
Nealbarbitone: 5- allyl- 5- neopentylbarbituric acid; Censedal: Neventa.
Paromomycin: an antibiotic produced by *Streptomyces rimosus forma paromomycinus*; D- glucosaminedeoxystreptamine D- ribosediaminohexose; Humatin is the sulphate.
Pralidoxime iodide: Picolinaldoxime methiodide; Protopam.
Sodium ipodate: Sodium β- (3- dimethylaminomethylenamino- 2:4:6- tri- iodophenyl) propionate; Biloptin.
Spironolactone: β- (7α- acetylthio- 17β- hydroxy- 3- oxoandrost- 4- en- 17-α yl) propionic acid lactone; Aldactone.
Sulphinpyrazone: 1:2- diphenyl- 4- (2- phenylsulphinylethyl) pyrazolidine- 3:5- dione; Anturan.
Thioproperazine: 2- dimethylsulphamoyl- 10- (3- (4-methylpiperzain- 1- yl)- propyl) phenothiazine; Majeptil is the methanesulphonate.

New S.I.M.A. Instruments Directory

The 1960 edition of the *British Instruments Directory and Buyers' Guide*, introduced on 17 May, is now obtainable from the Scientific Instrument Manufacturers' Association of Great Britain, 20 Queen Anne Street, London W.1. Seven thousand copies are to be printed and over 1,000 orders have already been received for the new edition.

Import Duties on Chemicals and Zirconium Sponge

The Import Duties (Temporary Exemptions) (No. 5) Order, 1960, effective from 14 May, revokes the temporary exemptions from import duty chargeable on certain chemicals and zirconium sponge and provides that the goods listed in a second schedule shall be exempt from the duty until specified dates. The order is published as S.I. 1960/829.

Overseas News

SPENCER TO MARKET HALF OF HUMBLE OIL'S NEW POLYPROPYLENE OUTPUT

THE U.S. companies, Spencer Chemical and Enjay Co., have entered upon an unusual agreement, under which Spencer Chemical will sell half of the polypropylene produced by Humble Oil and Refining and control their share of the manufacturing source. Enjay and Humble are both affiliates of Standard Oil. This four-year contract is unusual in that Humble will produce the resin according to Spencer's specifications but Spencer will make their own quality control tests, returning the resin to Humble's plant if it does not come up to specification.

Spencer Chemical are not planning to build their own polypropylene plant because of the uncertain patent position, which is not expected to become clearer for a few more years. The Humble plant, with a 40 million lb./year capacity, has just come into production. Designed by Esso Engineering and Research, it is the largest polypropylene facility in the U.S.

Spencer Chemical make polythene under a licence from I.C.I. The company also produce nylon-6 under licence, having entered that field in 1956.

Hooker to Manufacture Sodium Hexametaphosphate

Construction of facilities to manufacture sodium hexametaphosphate will be undertaken almost immediately by the Phosphorus Division of Hook Chemical Corporation. The installation, expected to be completed by December 1960, will be located at Jeffersonville, Ind.

Construction of the new facilities is proceeding simultaneously with another plant now being built at Jeffersonville for the manufacture of tetrapotassium pyrophosphate, to be completed in the autumn.

First Polyisobutylene Production in Europe

Naphtachimie, jointly owned by Pechiney and Soc. Française de Petroles B.P., a subsidiary of British Petroleum, will become Europe's only producer of polyisobutylene. The company is building a plant at Lavera in southern France, where it will manufacture polyisobutylene under license from U.S. Cosden Petroleum. The licence gives Naphtachimie exclusive manufacturing rights in the six-nation Common Market.

U.S. Shell Chemical to Raise Polyisoprene Capacity

Shell Chemical Co. Division of Shell Oil Co., U.S., are to increase production of polyisoprene to 120 million lb. a year. This increase in capacity will involve construction at a midwestern location of an integrated monomer-polymer plant of 80 million lb./year. Hydrocarbon feedstocks will come from the Shell Oil's Wood River Refinery.

Shell isoprene rubber has been manufactured commercially on a scale up to five tons a day at Torrance, Calif., for slightly over a year. Customers throughout the country have evaluated the new rubber in a wide variety of products, ranging from elastic bands to tyres for earth-moving machinery. The Torrance Plant is currently being expanded to a capacity of 40 million lb./year of polyisoprene, with completion of construction expected this autumn. The midwest installation, now in an advanced stage of engineering design, will be on stream a year later.

Nicholas Shelve Factory Plans for Natal

Plans of Nicholas Products, South African subsidiary of Aspro-Nicholas Ltd., to build a £250,000 factory in Natal have been shelved. Preliminary building work had begun. A new marketing strategy is to be introduced. Since the factory was planned, the Aspro-Nicholas Group have acquired Griffiths Hughes Proprietaries in the U.K. and have reached a marketing arrangement with Dow Chemical International, South Africa.

34th Fauser-Montecatini Urea Plant for Portugal

Societá Montecatini, Milan, and Uniaõ Fabril Do Azoto, Lisbon, have signed an agreement concerning the construction, at Lavradio, near Barreiro on the River Tago, Portugal, of a large plant for the production of urea, using Fauser-Montecatini processes. The new plant will be able to operate both on 'full liquid-phase recycling' (turning the whole of ammonia into urea) and on 'partial recycling' (yielding, besides urea, various nitrogen compounds).

Ammonia necessary for the process will be produced in an adjoining plant. The Lavradio plant will be the 34th built in the world for the production of urea by the Fauser-Montecatini process.

Texas Gulf Sulphur Acquire Potash Interests

Speculation that Texas Gulf Sulphur intended to acquire and commercially develop potash property owned by Delhi-Taylor Oil in Utah was confirmed by the chairman at the annual meeting of Texas Gulf Sulphur. Delhi-Taylor have been guaranteed an advanced net profit payment of $4.5 million and will retain a 25% net profit interest in the property. The study of technical aspects is still to be completed but commercial development will probably begin immediately afterwards.

New Sulphuric Acid Plant will Use Spent Alkylation Acid

A new sulphuric acid plant for the U.S. company, Collier Carbon and Chemical, is under construction at Wilmington, Calif. The plant, with an output of 250 tons a day, will use spent alkylation acid, hydrogen sulphide and sulphur as raw materials.

F.D.A. Clears Searle's Oral Contraceptive

The first drug to obtain clearance from the U.S. Food and Drug Administration for use as an oral contraceptive is Envoid, 17-ethnyl-17-hydroxy-5(10)-estren-3-one. G. D. Searle and Co., manufacturers of the drug, which has been used since 1957 to treat menstrual and pregnancy disorders, say they have no immediate plans to promote the compound as a contraceptive.

Soc. Terni Make Less Calcium Carbide

Output of Societa Terni of calcium carbide in 1959 was slightly below that of 1958, but the sales of packaged carbide rose by 11%. Sales of calcium cyanamide declined 16%. The company's plants at Nera Montora produced 32,000 tons of ammonia, 9% less than in 1958; 90,000 tons of calcium nitrate, 2% up; and 43,000 tons of ammonium sulphate, 27% more.

Du Pont Expanding Manufacture in Europe

A major portion of Du Pont's international manufacturing expansion is expected to take place in Europe, it was stated at the opening of the new paint plant of Du Pont de Nemours (Belgium) S.A., recently.

The plant and the Du Pont subsidiary in Belgium are part of a substantial expansion of the group's total international business activities part of which was the doubling of the original size of the Malines plant.

The plant, the first Du Pont manufacturing venture in Continental Europe, was officially opened on 26 April, by Jacques Van der Schueren, Belgian Minister of Economic Affairs.

Liquid Carbonic to Build New Ontario Carbon Dioxide Plant

Liquid Carbonic Canadian Corporation are to build a $2,500,000 carbon dioxide processing plant between Prescot and Maitland, Ontario, on a site adjacent to the plant of Brockville Chemicals now under construction. The new plant will use carbon dioxide gas from Brockville Chemicals under a long-term agreement and will have a daily capacity of 75 tons of gaseous, liquid or solid carbon dioxide. It is scheduled to go on stream in 1962.

Liquid Carbonic, a subsidiary of General Dynamics, U.S., now have

carbon dioxide plants in Halifax, Quebec City, Montreal, Toronto, Winnipeg, Edmonton and Vancouver. Liquid Carbonic also produce oxygen, acetylene, nitrogen, hydrogen and argon.

Jefferson Lake's Sulphur Output in Canada

Production by Jefferson Lake Petrochemicals of Canada Ltd. for 1959 was 47,718 long tons of sulphur and sales were 40,272 tons. Inventory at year-end was 66,718 tons. In 1958 production was 55,896 tons but no sales were made. The year 1959 was the first full year of sales since the company's Taylor, B.C., plant started operations. Jefferson Lake of Canada is owned 69% by Jefferson Lake Sulphur Co. of New Orleans, La.

Ammonium and Nitric Acid Plant for Cartagena

The International Petroleum Co. are to install a plant for the production of ammonium and nitric acid at Cartagena, Colombia, at a cost of U.S.$13.2 million. The plant will supply the Cia. Organizadora de Industrias de Abonos y Productos Quimicos, a recently-formed company with a U.S.$12 million capital, with the necessary raw materials for the manufacture of chemcial fertilisers.

Cheaper Nuclear Fuel Elements from U.S. Firm

Spencer Chemical, U.S., have developed an undisclosed process to make 'arc-fused' crystalline uranium dioxide, thorium dioxide, urania-thoria, triuranium octoxide, and uranium mono- and dicarbides. The crystalline forms of the fuels, which can be compacted in tubes to form rods of 91 to 92% density (theoretical), will be cheaper than the sintered ceramic pellets (density 88 to 90%), say Spencer.

New U.S. 120 Million lb. o-Xylene Plant

Cities Service are building an *o*-xylene plant (95% ortho) at Lake Charles, La., designed to produce 120 million lb. per year for export through Fallek Chemical, N.Y. Fallek are under contract to Cities Service - Cosden Petroleum. Cosden's present output of *o*-xylene (99% ortho), which they had previously considered boosting to 80 million lb. per year, is 10 million lb.

Compulsory Fluoridation of Norway's Drinking Water

The Norwegian Government will soon submit a Bill to the Storting which, if passed, will authorise local authorities to fluoride drinking water in order to combat tooth decay.

International Dyes Symposium in Basle

A symposium on dyestuff chemistry is to be held in Basle, Switzerland, from 24 to 29 June at which some 30 papers will be given by well-known experts from a range of countries. The symposium is organised by the Swiss Chemists's Society and patronised by the important dyestuff producers based in Basle and Basle University. Further details are available from Schweizerischer Chemikerverband, Geschäftsstelle Zürich, Seefeldstrasse 8, Zurich.

FluoSolids System for Rhodesian Cobalt Plant

The 32nd Dorr-Oliver FluoSolids reactor to be into operation in South, Central and East Africa, has been ordered for the Nkana cobalt plant, Northern Rhodesia, of the Rhokana Corporation. Design, supply and erection will be handled by Edward L. Bateman, Johannesburg. The system includes a concentrates storage bin, feed conveyor repulping and storage agitators, FluoSolids reactor with working platforms and building, gas-cleaning cyclones, calcine discharge FluSeals, blower, instrumentation, etc.

Rumanian Aniline Output Doubled

First of the two aniline production plants at the Colorom Codlea factory, Rumania, has gone on stream, doubling capacities for production of aniline required in the dyestuffs and drug industries.

At the antibiotics factory in Jassy a department has been set up for manufacture of vitamin B_{12}, built to a Soviet design and with Soviet equipment.

Finnish Cellulose Expansion Plans

With the completion of all expansion plans projected by the Finnish wood-processing industry up to 1962, some of which are already being worked on, production will stand at an annual level of 270,000 tonnes of sulphite cellulose, 750,000 tonnes of sulphate cellulose and 160,000 tonnes of semi-cellulose. Last year Finland's 29 producers turned out some 320,000 tonnes of sulphate cellulose. Total expansion of the cellulose industry as a whole is planned to be in the region of 40%.

Production and Exports of Italian Sulphur Down

Final figures produced by the Central Institute of Statistics, Rome, show that Italian production of molten raw sulphur, 121,186 tons, fell by about 24% in 1959, against the previous year's total. Exports of the material in 1959 were some 29 000 tons, to the value of Lire 611 million; i.e. 4.2% less in quantity and 13.2% less in value than the 1958 totals.

Lighter-than-air Plastics

A plastics foam which is lighter than air has been developed by scientists in the Soviet Union, it is reported. The plastics base is first pre-foamed with pentane, then undergoes repeated foaming with hydrogen, so that a structure of closed macro-pores filled with hydrogen is formed.

Spanish Fertiliser Duty

The higher import duty that the Spanish Government is to levy on nitrogenous fertilisers as an encouragement to indigenous production and protection against dumping, is now one of 15% *ad valorem* plus 420 pesetas per tonne.

French Credit for Vietnam Chemical Industry

A credit totalling Fr.18,000 million has been granted by France to South Vietnam. Part of this credit is to be used by the country's Government to finance the building up of a chemical industry in the Tourane region, a development which demands some Fr.7,000 million investments. The country has also had negotiations with the U.S. Development Loan Fund.

Farmers Oppose Canadian Chemicals Move For Higher Tariff Protection

THE Canadian chemical industry has opened its case for more equitable tariff treatment and pointed out that this would enable a $100 million increase in Canadian chemical production. The industry's arguments were made as the Tariff Board started its major chemicals industry review. The arguments of the industry immediately met opposition from the Canadian Federation of Agriculture.

Mr. Gordon Blair, C.F.A. counsel, suggested that the chemical firms now enjoyed protection from patents and licensing agreements. He also attacked one industry proposal that, he indicated, might limit the present broad tariff exemptions on imported goods for use in agriculture.

The Canadian chemical industry brief was presented by J. A. Davis of Du Pont of Canada, Montreal. It said the industry is not seeking a general increase in the level of tariffs on chemical imports. However, the brief served notice that tariff increases will be urged "mainly on synthetic organic chemicals, plastics and a limited group of other products". The industry would seek tariff increases on these products to rates that apply to most other Canadian-made chemicals; 15% on Commonwealth products and 20% on imports from most-favoured nations.

It was said that 1958 Canadian production of chemicals under review by the tariff board totalled $903.7 million. Imports that year totalled $274 million, chiefly from the U.S., while export sales amounted to $138 million. From a detailed analysis of 1958 imports, it was concluded that more equitable tariff treatment would have permitted the manufacture in Canada in 1958 of additional chemicals amounting to about $100 million. This production would displace imports.

One main criticism was that tariff protection on many goods was often nullified by special exemptions for imports going into specified uses. Mr. Davis said that if that system of 'end use' exemptions was continued, its application should be limited and specific.

PEOPLE in the news

● **Mr. E. S. Lower,** technical director, and **Mr. N. R. Kirkby,** general sales manager, of Croda Ltd., Cowick Hall, Snaith, Goole, Yorks, have sailed for Scandinavia to liaise with Croda's agents in Norway, Sweden and Denmark and to investigate the market there for Croda's range of fine chemicals, surface active agents and rust preventive oils and coatings.

● **Mr. W. S. Harrington** has expressed his wish to relinquish his position as a director of W. and H. M. Goulding Ltd., 22 Molesworth Street, Dublin, and his resignation from the board has been accepted with regret. **Mr. J. A. Robertson** has been appointed a director.

● **Dame Kathleen Lonsdale, F.R.S.,** Professor of Chemistry and head of the Department of Crystallography, University College, London, will be admitted to the honorary D.Sc. degree of the University of Wales next September.

● **Mr. J. V. Drake** has been appointed resident director of British Benzole and Coal Distillation Co. Ltd. He has been with the company for a number of years, latterly as production and general manager.

● **Mr. J. L. S. Steel,** recently retired from the board of Imperial Chemical Industries after 37 years' service, has been elected to the board and appointed deputy chairman of Triplex Holdings Co. Ltd. Mr. Steel, who is 60, was for some years responsible for economic planning with I.C.I., with special interest in the Common Market and Free Trade Area.

● **Dr. J. G. Davis** (Dr. J. G. Davis and Partners, 9 Gerrard Street, London W.1) chairman of the Association of Consulting Scientists was re-elected at the annual meeting held in London recently. **Dr. G. W. Ferguson** (Parry and Ferguson) was re-elected hon. treasurer and **Mr. W. H. Stevens,** Park House, Hawthorne Road, Bromley, Kent, was re-elected hon. secretary. Members of the council are: **Dr. M. Barent, Dr. H. H. Chambers, Dr. Julius Grant, Dr. J. H. Oliver, Mr. O. W. Roskill** and **Mr. F. G. Sarel Whitfield.**

● **Mr. A. A. Pratt,** Southern Oil Co. Ltd., and **Mr. H. Mavity,** Thomas Hedley and Co. Ltd., were elected chairman and vice-chairman respectively at the recent annual meeting of the Edible Oil Refineries' Association.

● **Mr. E. Brett Davies,** of Midland Tar Distillers Ltd., Oldbury, is leaving the company on 31 May to join Cawood Wharton and Co. Ltd., Harrogate.

● **Mr. J. G. Window,** sales director of Q.V.F. Ltd., Fenton, Stoke-on-Trent, left New York on a flying visit to Mexico on Tuesday this week. He was expected back in New York, where he is staying for about seven weeks in connection with the Q.V.F. exhibit at the British Trade Fair in June, on Friday. The company is hoping to open up new markets for industrial glass plant in Mexico.

● **Mr. Nelson Cannon** has been appointed general manager, Canada, for Roger Williams Technical and Economic Services, Inc., who carry out consulting chemical market research and allied industrial economic studies. He will be in charge of the new branch which has been opened at 170 Donway West, Don Mills, Toronto, Canada. Other offices include the headquarters at Princeton, and branches in New York and London.

● **Mr. N. Fenwick** has been appointed sales promotion manager of W. G. Pye and Co. Ltd.

● **The Duke of Edinburgh** paid an informal visit on 13 May to the research laboratories of the British Food Manufacturing Industries Research Association, at Leatherhead, and was welcomed by the president, Professor A. C. Frazer.

● **Mr. J. D. Chiswell,** formerly managing director of Bayer Products Ltd., Kingston-upon-Thames, Surrey, and Winthrop Products Ltd., has been appointed group advisory director—Finance. **Dr. R. S. Inch,** a director of Bayer Products, Winthrop Products, and a number of the Winthrop European companies, now has wider responsibilities as director of group developments, and will be appointed to the board of Winthrop Laboratories Ltd. **Mr. C. R. B. Williamson** has been elected managing director of Bayer Products and Winthrop.

Concerned in new Bayer Products appointments are J. D. Chiswell (above), Dr. R. S. Inch (above right) and C. R. B. Williamson (right)

● **Sir Cyril Hinshelwood,** Dr. Lee's Professor of Chemistry at Oxford and president of the Royal Society, is among the 14 recipients named for the honorary degree of Doctor of Civil Law to be conferred by the Prime Minister in his capacity as Chancellor of Oxford University. The ceremony will take place in the Sheldonian Theatre on 22 June.

● **Dr. M. I. H. Green, Ph.D.(London)** has been appointed a university demonstrator in the Department of Organic and Inorganic Chemistry, Cambridge, with tenure for three years from October next.

● **Mr. St. J. Elstub,** joint managing director of I.C.I. Metals Division and a director of Amal Ltd., an I.C.I. subsidiary, has been appointed deputy chairman of Amal.

● On 11 May, the Hinchley Medal of the British Association of Chemists was presented to **Dr. C. J. T. Cronshaw** for his "great services to the chemical industry" while head of the I.C.I. Dyestuffs Division. The presentation was made at a private ceremony in Dr. Cronshaw's home by the president, **Mr. J. Wilson, C.B.E., M.C.**

● **Mr. David H. Conklin,** European director of Du Pont's International Department, has been appointed assistant general manager of the department. **Mr. Milton H. Campbell,** assistant European director, becomes European director. **Mr. John K. Jenney** becomes assistant to the general manager of the International Department and will be concerned with all phases of the operation of the department as well as a director of a number of subsidiary companies. Mr. Conklin, whose office has been in Geneva, has returned to Wilmington to take up his new duties.

● **Mr. R. Langford** and **Mr. I. H. Phillipps** have joined the board of Humphreys and Glasgow Ltd., 1 Carlisle Place, London S.W.1. Mr. Langford, who is 40, has been with the company since 1946 and an associate director since 1957. He is chief contracts manager. Mr. Phillipps, 35, also an associate director since 1957, joined the company in 1945. **Mr. G. Adams** and **Mr. R. J. Withers** have been appointed associate directors.

● **Mr. H. Crowther,** formerly managing director, has been appointed chairman of Baker Perkins (Exports). **Mr. H. S. Hargreaves** has been appointed managing director. **Mr. A. I. Baker,** chairman of Baker Perkins, the parent company, and former chairman of the export company, will continue as a director.

● **Mr. Bruce S. Smith** has been appointed head of the Isotope Research Division of the U.K. Atomic Energy Authority. His successor as head of the Health Physics Division at Harwell is **Mr. N. G. Stewart.**

Commercial News

- **Boots' Profit Higher by £1.4 million**
- **Cyanamid's Record Turnover and Profits**
- **C.I.L. Hope for Change in Tariff Rates**
- **U.S. Borax Pay First Dividend Since 1958**

Baker Perkins

Group profit of Baker Perkins Ltd. for the year ended 29 December was £771,526 (£893,972 including gain on plant sale). Dividend of 10% (same) is announced with one-for-four scrip issue. Mr. A. I. Baker, chairman, says that the group is now participating in the renewed demand for plant and equipment both at home and overseas.

Boots Pure Drug Co.

Results and final dividend of Boots Pure Drug Co. Ltd. for the year ended 31 March 1960 show a group net profit of £3,826,004 (£2,442,241), and the dividend is increased from 16% to 21% with a final of 15%.

Amount of the Profit Earning Bonus for the staff charged in arriving at the profits is £702,360 against £464,280 for the previous year.

Bydand Distillers

Consolidated trading profits of Bydand Distillers and Chemicals Ltd. for the year ended 31 March were £157,955 (£153,521). After tax of £68,328 (£67,314), net profit was £74,805 (£69,207). A final dividend of 12½%, making 20% (equivalent of 18½%) is announced, with a one-for-five scrip issue.

Edwards High Vacuum

Export sales of Edwards High Vacuum have been maintained at a high level said Lord Wilmot, chairman, in his annual review, and many overseas contracts have been secured. Edwards High Vacuum Inc. started trading last year as a subsidiary of the Canadian company and have gained valuable U.S. orders. It is hoped that extensions to the research, production and administration buildings at Crawley will be completed early in 1961. Additions to the instrument range are said to justify the setting up of a new subsidiary.

American Cyanamid

American Cyanamid Co. registered record turnovers and net profits in the first quarter of the current year. Net profit for the quarter was $16,500,000, or 78 cents ($13,100,000). Both turnover and profits are expected to rise further during the course of the year. Between $40 and $50 million are to be invested by the company this year, some 20% of them on foreign projects.

Canadian Industries

Consolidated sales of Canadian Industries Ltd. for the first quarter of 1960 were about 18% above the same period of 1959 and, although figures are not yet available, net income is also expected to show an increase. Terylene sales were higher for the three month period, especialy in export markets.

Expenditures on new plant and equipment totalled $7 million in 1959, which included about $4 million to complete work authorised prior to 1 January 1959. Estimated cost of completing projects under construction at 31 December 1959 was $1.5 million. Since 1954 C-I-L have spent more than $65 million on new plants.

Cassella Farbwerke Mainkur AG

The Frankfurt-on-Main producer of dyestuffs, Cassella Farbwerke Mainkur AG, announce for the financial year 1959 a suggested dividend of 16% (14) on a capital of DM34,100,000 (some £2,850,000). The three IG Farben successor companies are interested in Cassella.

U.S. Borax & Chemical

U.S. Borax and Chemical Corporation have declared a dividend of 15 cents on Common shares, the first payment since September 1958.

E.I. Du Pont

E.I. Du Pont de Nemours and Co. achieved a per-share net profit of only $2.10 per ordinary share in the first quarter of 1960 as against one of $2.17 in the first three months of last year. Of this $1.46 (1.53) came from Du Pont profits and the rest from General Motors.

W. R. Grace and Co.

Earnings for 1959 of $14,827,290 were 48% higher than in 1958, according to W. R. Grace and Co.'s annual report to stockholders. The principal factor in the improvement was a substantial rise in the earnings of the chemical divisions, which contributed 68% of total pretax operating profits.

Chemical profits rose 44%, with all chemical divisions surpassing their results of 1958.

Houdry Process Corp.

Houdry Process Corporation earned $2.45 ($2.15 previously) per share in 1959 on consolidated net income of $810,210 ($712,878). In the last 10 years the company has increased net assets by 74%, gained a 47% improvement in net income and almost doubled the per share book value of the stock.

I.C.I.A.N.Z.

I.C.I.A.N.Z., a subsidiary of Imperial Chemical Industries Ltd., announce sales of £48 million for the year ended 30 September; products from the company's Australian and New Zealand factories accounted for about 77% of those sales. The company is planning extensions to many of its plants before the substantial abandonment of import licensing is announced.

Texas Butadiene

The merger proposal between the U.S. companies, Industrial Rayon Corp. and Texas Butadiene and Chemical (CHEMICAL AGE, 7 May, p. 773), has been withdrawn. Difficulties arose when many I.R.C. shareholders announced their intention to demand cash for their shares. Under the circumstances Texas Butadiene considered it inadvisable to proceed with the merger.

INCREASE OF CAPITAL

A. BOAKE, ROBERTS AND CO. (HOLDING) LTD., Abrac Works, Carpenters Road, London E.15. Increased by £900,000, beyond the registered capital of £900,000.

NEW COMPANIES

ALLIANCE DYE AND CHEMICAL CO. LTD. Cap. £5,000. To act as manufacturers' agents and representatives and selling agents for and on behalf of 'Compagnie Francaise Des Matieres Colorantes' of Paris, etc. Directors: G. L. Harmsworth, P. E. Glover. Sec.: P. E. Glover. Reg. office: Grecian Mills, Lever Street, Bolton.

OIL AND TAR TRADING CO. LTD. Cap. £1,000. To import, export and deal in petroleum and its derivatives, coal tar and its derivatives chemicals, etc. Secretary: James P. Davisson.

DIARY DATES

MONDAY 23 MAY

Inst. Fuel.—London: Inst. Civil Engineers, Gt. George St., S.W.1., 5.30 p.m. 'Recommendations on heights for new industrial chimneys', by G. Nonhebel.

C.S.—Newcastle: Chemistry Dept., King's College, 5.30 p.m. Centenary Lecture: 'Chemical constitution & immunological specificity', by Prof. M. Heidelberger.

TUESDAY 24 MAY

Soc. Instrument Tech.—London: Mansion Hse., 26 Portland Pl., W.1., 6 p.m. London section a.g.m., followed by presidential address by R. S. Medlock.

WEDNESDAY 25 MAY

C.S.—Hull: Physics Lecture Theatre, University, 5.30 p.m. 'Chemical constitution & immunological specificity', by Prof. M. Heidelberger.

FRIDAY 27 MAY

C.S.—Cambridge: University Chemical Laboratory, Lensfield Rd., 5 p.m. Centenary Lecture: 'Chemical constitution & immunological specifity', by Prof. M. Heidelberger.

S.A.C. with R.I.C.—Plymouth: 'Trace elements in sea water', by Dr. L. A. N. Cooper.

Soc. Cosmetic Chemists of Gt. Britain.—London: 55 Park Lane, W.1., 7 p.m. A.g.m.

NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sales Branch), 25 Southampton Buildings, Chancery Lane, London W.C.2, price 3s 6d including postage; annual subscription £8 2s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection 22 June

Preparation of vinyl ethers. Rohm & Haas Co. **838 020**

Derivatives of 6-mercaptopurine. Wellcome Foundation Ltd. (Burroughs Wellcome & Co. (U.S.A.) Inc.). [Addition to 838 821.] **838 820**

Preparation of titanium tetrachloride. Armour Research Foundation. **838 822**

Manufacture of halogen-containing polymers. Farbwerke Hoechst. **838 651**

Production of polymerisation products from olefinically-unsaturated hydrocarbons. Badische Anilin- & Soda-Fabrik AG. **838 227**

Polymerisation catalyst. Esso Research & Engineering Co. **838 028**

Process for the production of hydroperoxides. Imperial Chemical Industries Ltd. **838 029**

Manufacture of quinone derivatives. Ciba Ltd. **838 993**

Process for manufacturing plastic compounds and lacquer coatings from glycidyl ether epoxides. Leuna-Werke W. Ulbricht Veb. **838 652**

Steroid compounds. Merck & Co. Inc. **838 228**

Anthradepyridazones and their use in polymeric materials. Imperial Chemical Industries Ltd. **838 994**

Production of copolymers from olefinically-unsaturated monomers. Goodrich-Gulf Chemicals Inc. **838 996**

Treatment of hydrated zinc oxide. Brotherton & Co. Ltd. **838 851**

Steroids and the production thereof. Upjohn Co. **838 654**

Monoazo dyestuffs containing a triazine residue. Imperial Chemical Industries Ltd. **838 341**

Production of gibberellic acid. Imperial Chemical Industries Ltd., Borrow, A., Jefferys, E. G., and Nixon, I. S. **838 032**

Process for the production of gibberellic acid. Imperial Chemical Industries Ltd., Borrow, A., Jefferys, E. G., and Nixon, I. S. **838 033**

Production of acrylic acid and its salts. Badische Anilin- & Soda-Fabrik AG. **838 854**

Dyestuffs of the benzene-monoazopyrazolene series and metal complexes thereof and process for their manufacture. Ciba Ltd. **838 657**

Method for the manufacture of ammonium sulphate. Coppe Co. (Great Britain) Ltd. **838 658**

Monoazo dyestuffs derived from cyanuric bromide. Imperial Chemical Industries Ltd. **838 342, 838 343, 838 344 & 838 345**

Magnesium tetraboride and the production thereof. Olin Mathieson Chemical Corporation. **837 979**

Process and apparatus for producing a slurry of catalysts in hydrocarbon diluent for chemical reactions. Phillips Petroleum Co. **838 395**

Manufacture of chromic anhydride. Diamond Alkali Co. **838 715**

Penicillin derivatives. Beecham Research Laboratories Ltd. **838 974**

Process for the continuous preparation of epoxyalkyl esters of carboxylic acids. Henkel & Cie GmbH. **837 980**

Coloured polyesters. Imperial Chemical Industries Ltd. **838 716**

Regeneration of degraded alkyl anthraquinone solutions for the production of hydrogen peroxide. Laporte Chemicals Ltd. **838 939**

Low foaming detergent compositions. General Aniline & Film Corporation. **838 975**

Dye-receptive polymer compositions. Dow Chemical Co. **837 982**

Treatment of polymers. Imperial Chemical Industries Ltd. **838 977**

Polymerisation of olefins. Bataafsche Petroleum Maatschappij N.V., De. **838 720**

Monoazine triazine dyestuffs. Imperial Chemical Industries Ltd. [Addition to 774 925.] **838 307**

Process for the production of polyhydric alcohols. Inventa Aktiengesellschaft Für Forschung Und Patentverwertung. **838 510**

Organotin dispersions. Permachem Corporation. **838 722**

Copper-containing triazine monoazo dyestuffs. Imperial Chemical Industries Ltd. **838 311 & 837 985**

Piperazine derivatives and process. Morren, H. **837 986**

Converter for liquefied gases. British Oxygen Co. Ltd. **838 552**

Dispersions of vinyl ester polymers. Revertex Ltd. **838 943**

Polymerisation catalysts. Imperial Chemical Industries Ltd. **838 723**

Substituted amides and analogous compounds. Lepetit S.p.A. **838 724**

Refining of polyolefins. Union Carbide Corporation. **838 726**

Foamed articles from high molecular weight thermoplastic polycarbonates. Farbenfabriken Bayer AG. **838 824**

Copolymers of N-vinyl cyclic amides. Esso Research & Engineering Co. **838 235**

Diazo triazine dyestuffs. Imperial Chemical Industries Ltd. **838 728**

Manufacture of trialkyl boranes. Imperial Chemical Industries Ltd. **838 616**

Polymeric anhydrides. Imperial Chemical Industries Ltd. **838 986**

Polymer compositions. Imperial Chemical Industries Ltd. **838 732**

Diphenylamine process. American Cyanamid Co. **838 989**

Synthesis of β-Cyanopropionaldehyde. Ajinomoto Co. Inc. **838 737**

Manufacture of highly polymeric polymethylene terephthalates. Imperial Chemical Industries Ltd. **838 663**

Vinylidene halide resins. Goodrich Co., B. F. **838 239**

Production of acetyl acetone. Courtaulds Ltd. **838 142**

Process for forming sodium perborate crumbs. Deutsche Gold-Und Silber Scheideanstalt Vorm Roessler. **838 667**

Monoazo triazine dyestuffs. Imperial Chemical Industries Ltd. **837 990**

Synthetic polyamides. Imperial Chemical Industries Ltd. **838 668**

Synthetic polyesters. Imperial Chemical Industries Ltd. **838 669**

Fluoroelastomers. Du Pont De Nemours & Co., E.I. **838 281**

Production of 5-hydroxymethyl furfural. Merck & Co. Inc. **838 957**

Isonicotinoylhydrazine derivatives. Takeda Pharmaceutical Industries Ltd. **838 670**

Copolymers of tetrafluoroethylene and fluorinated olefins and their preparation. Du Pont De Nemours & Co., E.I. **837 993**

Production of chloroprene. Distillers Co. Ltd. **838 914**

Substituted phenoxyacetic amides. Geigy AG., J. R. [Addition to 792 490.] **837 995**

Metal-containing polyazo dyestuffs. Farbenfabriken Bayer AG. **837 996**

Polymeric materials. Imperial Chemical Industries Ltd. **838 741**

Process for preparing N-(β-substituted-ethyl) piperazines. Abbott Laboratories. **838 744**

Method of recycling reactants and recovering polymer in polybutene manufacture. Esso Research & Engineering Co. **838 402**

Processes for the recovery of ammonia from coke oven gas. Koppers Co. Inc. **838 001**

Higher alkylpyridine-N-oxides. Parke, Davis & Co. **838 746**

3-Hydroxy-3,7,11-trimethyldodecanoic acid and salts thereof. Merck & Co. Inc. **838 568**

Process for preparing copolymers. Solvic S.A. **838 750**

Polymerisation catalysts. Solvic S.A. **838 002**

Process for the polymerisation of chloroprene. Farbenfabriken Bayer AG. **838 752**

Reduction of the sulphur content of ferrous metals. Union Carbide Corporation. **838 005**

Production of copolymers from unsaturated polyester resins. Badische Anilin- & Soda-Fabrik AG. **838 007**

Compositions comprising or consisting of polymerised vinyl-aromatic compounds and processes for the preparation thereof. Styrene Products Ltd. **838 407**

Dyestuffs of the anthraquinone series. Farbenfabriken Bayer AG. **838 755**

Preparation of 17α-homologues of 19-nor-testosterone and intermediate compounds. De Ruggieri, P. **838 756**

Hydrocarbon polymer coating compositions. Du Pont De Nemours & Co., E.I. **838 802**

Copolymers. Hercules Powder Co. **838 963**

Processing of polyethylene and copolymers of ethylene. Hercules Powder Co. **838 964**

Preparation of urea. Stamicarbon N.V. **838 757**

5-(*O*-substituted-phenoxy-methyl)-2-oxazolidone compounds and their preparation. Laboratoires O.M. S.A. **838 759**

Hydrazine derivatives and a process for their manufacture. Sandoz Ltd. **838 760**

Azothiacycloalkenes. Monsanto Canada Ltd. **838 763**

Compositions comprising unsaturated resinous polyester and N-vinyl pyrrolidones. General Aniline & Film Corporation. **838 764**

Polyolefin plastics. Argus Chemical Corporation. **838 502**

Polymeric material comprising low pressure Ziegler polyolefines. Petrochemicals Ltd. **838 042**

Process for the preparation of diborane. Rhone-Poulenc. **838 769**

Process for the production of dialkyl sulphoxides. Union Rheinische Braunkohlen Kraftstoff AG. [Addition to 813 898.] **838 680**

Polyene dicarboxylic acids and esters thereof and a process for the manufacture of same. Hoffmann-La-Roche & Co. AG., F. **838 926**

Process for dehydrating alkyl α-hydroxy-isobutyrates. Knapsack-Griesham AG. **838 685**

Process for dyeing polyolefine or polyvinylidene chloride filaments. Vereinigte Glanzstoff-Fabriken AG. **838 687**

Modifying butyl rubber. Esso Research & Engineering Co. **838 045**

Process for the production of hydrazine compounds. Farbenfabriken Bayer AG. **838 692**

Oxyalkylated phosphorsulphurised hydrocarbons and lubricating compositions. Esso Standard Soc. Anon. Francais. **838 928**

Dicarbamates of 2-substituted-2-allyl propanediols. Frosat & Co., C. E. **838 702**

Process for extractive alkylation. Universal Oil Products Co. **838 489**

Preparation of an androstadiene derivative. Laboratoires Francais De Chimiotherapie. **838 697**

1-(β-hydroxyethyl)-2-methylmercapto-2-imidazolinium chloride and a process for its preparation. Monsanto Canada Ltd. **838 699**

Use of nuclear fission in synthesising organic compounds. Hercules Powder Co. **838 361**

Preparation of titanium. Union Carbide Corporation. **838 916**

Process for alkali metal borohydrides. Farbenfabriken Bayer AG. **838 842**

Production of polymers of conjugated dienes. Bataafsche Petroleum Maatschappij N.V., De. **838 368**

Prevention of popcorn polymer with hydrazine and unsymmetrical dimethyl hydrazine. Triggs, W. W. (Goodyear Tire & Rubber Co.). **838 289**

Substituted butyryl chlorides. Lepetit S.p.A. **838 725**

Process for preparing catalyst. Gulf Research & Development Co. **838 843**

Preparation of olefin alkylation feeds. Esso Research & Engineering Co. **838 844**

Modified synthetic condensation polymers and their production. Du Pont De Nemours & Co., E.I. [Divided out of 838 412.] **838 413**

6-Purinylthioglycosides and their manufacture. Wellcome Foundation Ltd. (Burroughs Wellcome & Co. (U.S.A.) Inc.). [Divided out of 836 696.] **838 021**

4-Substituted steroid compounds and preparation thereof. Soc. Farmaceutici Italia. [Divided out of 838 771.] **838 772**

4-Substituted steroid compounds and preparation thereof. Soc. Farmaceutici Italia. [Divided out of 838 771.] **838 773**

Open to public inspection 29 June

Separation of plutonium. Russell, E. R., Adamson, A. W., Schubert, J., and Boyd, G. E. **839 190**

Recovery of plutonium. Gofman, J. W., Connick, R. E., and Wahl, A. C. **839 191**

Separation of plutonium from solution. Brown, H. S., and Hill, O. F. **839 749**

Separation of fissionable solids from suspension. Chapin, J. H., and Huffman, J. R. **839 750**

TRADE NOTES

Unikote Northern Agents

The United Insulator Division, the Telegraph Condenser Co. Ltd., Oakcroft Road, Chessington, Surrey, have appointed R. P. Turner and Co. Ltd., 15 Westfield Terrace, Sheffield 1, as their northern agents for Unikote ceramic coatings. The area includes the counties of Lancashire, Yorkshire and Cheshire.

New Service for Packers

A new service has been introduced by the Glass Manufacturers' Federation, 19 Portland Place, London W.1, providing facilities to packers to test consumer acceptance of packages.

Gallenkamp-Towers Exhibitions

An exhibition of Gallenkamp-Towers laboratory apparatus at King's College, Newcastle upon Tyne, this week is to be followed by two further shows, state J. W. Towers and Co. Ltd., 28 Bridge Road, Stockton-on-Tees. The others will be held at the Black Lion Hotel, Stockton, on 24 and 25 May, from 10 a.m. to 7 p.m., and the third at the Midland Hotel, Manchester, on 15 June (2 p.m. to 7 p.m.), 16 June (10 a.m. to 7 p.m.) and 17 June (10 a.m. to 1 p.m.). A wide range of apparatus will be shown and demonstrated on both occasions.

New Sales Office

Polypenco Ltd., 68/70 Tewin Road, Welwyn Garden City, Herts, manufacturers of engineering industrial plastics including nylon and p.t.f.e., have recently established a new sales office at 117 Swan Arcade, Bradford 1, telephone: Bradford 32073.

New Thermosetting Adhesive

Availability of a new thermosetting adhesive, Silverlock F100, designed specifically for bonding p.v.c. compounds—either in the form of a plastisol or a calendered film—to steel and other metals is announced by B.T.R. Industries Ltd., Herga House, Vincent Square, London S.W.1.

Packaging Desiccant

Particulars of activated alumina desiccant packed and distributed by D. S. Hilton and Co., 2 The Crossways, New Ferry, Cheshire, are available from the company.

P.C.C. for Paper Coating

A new grade of precipitated calcium carbonate, intended primarily for paper coating where good opacity is required, has been introduced by John and E. Sturge Ltd., Wheeleys Road, Birmingham 15, under the trade name Calopake PC. This fine calcite is claimed to give paper an excellent surface finish, greatly improved whiteness and ink receptivity. Being a powder, Calopake PC is easier to transport, store and handle than the Sturge Calofort U paste which it largely supersedes.

Filter Aids for U.K.

After 10 years' research Filter Aids (Kenya) Ltd. have developed a comprehensive range of filter aids using finely blended and calcined diatomites which compare favourably with the purest Californian deposits. Introduced into this country free of duty by Dalgety London Ltd., 65-68 Leadenhall Street, London E.C.3 (Royal 6650), a subsidiary of Dalgety and Co. Ltd., they are particularly suitable for firms anxious to improve the rate of filtration and the clarity of high viscosity liquids. Stocks are held at all the main U.K. ports and technical literature is available from the agents.

Fullers' Earth Union

The trade name Fulmont is to be applied to all the standard grades of activated fullers' earth, state the Fullers' Earth Union Ltd. The particular grade designations will follow this trade name and will remain the same in each case.

Market Reports

Home Trade Demand Continues Brisk

LONDON Home trade demand for chemicals, during the past week, has been brisk with the main consuming industries calling for good quantities against contracts. There has been additional inquiry for the routine soda products, and hydrogen peroxide has been in steady request at the lower prices now ruling. The demand for agricultural chemicals is at about the average for the season. The price of copper sulphate as at 16 May, is £85 per ton f.o.b. Liverpool.

Fair activity has been reported for most items in the coal tar products market with prices unchanged and firm.

MANCHESTER Business in heavy chemical products on the Manchester market during the past week has followed a steady course and no more than minor fluctuations in prices have occurred. Fresh buying interest has been shown by both home consumers and shippers, and additional bookings have been on a satisfactory scale. The bread-and-butter lines, including the soda and potash chemicals, are being taken up steadily by home industrial users, largely against running contracts, and overseas shipments of general chemicals have been maintained at around the level of recent months. A fairly active trading position is also reported in most of the tar products.

SCOTLAND Trading has again been maintained at a good level with demands against spot and contract requirements featuring a varied range of industrial chemicals. There has also been a moderate proportion for forward deliveries.

The activity reported for agricultural chemicals has shown little change. There has been a continuance of seasonal enquiries and demands, particularly for weedkillers. Prices have shown little change and generally remain firm.

CLASSIFIED ADVERTISEMENTS

CLASSIFIED RATES: All sections 5d. per word. Minimum 8/-. Three or more insertions 4d. per word. Box Number 2/- extra. Up to 10 a.m Tuesday for insertion same week.

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FOR SALE

CHARCOAL, ANIMAL AND VEGETABLE, Horticultural burning, filtering, disinfecting, medicinal. Also lumps, ground and granulated. **THOMAS HILL-JONES, INVICTA WORKS, BOW COMMON LANE, LONDON, E.3 (TELEPHONE: EAST 3285).**

OFFICIAL APPOINTMENTS

GOVERNMENT OF KENYA
CHEMIST/ASSAYER,
MINES AND GEOLOGY DEPARTMENT

Qualifications: Applicants (men or women) preferably under 40, must have (or expect to obtain this year) a good Honours degree in chemistry or equivalent professional qualification. Experience in inorganic analytical chemistry and a good knowledge of instrumental methods and/or electronics desirable. Some knowledge of mineral dressing would be useful.
Duties will include assaying and quantitative analysis of rocks, minerals and ores and advising on metallurgical and chemical treatment problems connected with mineral extractions.
Terms of Appointment: On probation to the permanent and pensionable establishment with emoluments in the scale £939—£1,863 p.a. Quarters if available at rental. Free passages. Generous leave. Free medical attention. Taxation at local rates. Apply to Director of Recruitment, Colonial Office, London, S.W.1, stating full name, age, qualifications and experience and quoting BCD 99/7/07/F1.

PLANT AND MACHINERY FOR SALE

PHONE 55298 STAINES

850 gall. **Stainless Steel** Enc. Cyl. Tank.
40 gall. S.S. Jac. Pans (Four).
Alum. Tanks 1,000, 1,500, & 2,000 galls.
Glassed Lined Tanks 800 up to 10,000 galls.
(Two) 2,000 gall. Jac. Cyl. Mixers 9 ft. by 6 ft. 8 in. diam. 60 W.P.
(Three) Heavy 'Z' Blade Jac. Mixers 4 ft. 5 in. by 3 ft. 8 in. by 3 ft. deep.
'Worssam' Jac. Glanded Fin Blade Mixer 33 in. by 33 in. by 26 in.
Sectional Tanks 8,400, 6,400, & 4,800 galls.

Send for Stock Lists

HARRY H. GARDAM & CO. LTD.,
100 CHURCH STREET, STAINES

PLANT AND MACHINERY FOR SALE: continued

600

VERTICAL SHELL & TUBE REACTOR, 3/16 in. mild steel, 4 ft. 11/16 in. dia. 10 ft. long with outer water cooling jacket. Suitable for oil heating and containing 559—1¼ in. o.d. × 12 SWG. FMB. tubes 8 ft. 5 in. long with 1 in. thick FMB. tube plates and eight FMB. 10G internal baffles. TWO AVAILABLE.

BUBBLE CAP COLUMN in FMB stainless steel, six bolted sections each 23⅝ in. dia. by 39 in. high and with five trays and ten bubble caps per tray. Flat division tray and four dished trays connected by rods and distance tubes.

EVAPORATOR by **Johnson,** FMB stainless steel, comprising vertical cylindrical vessel 6 ft. 10½ in. dia. by 3 ft. 6 in. deep with 1 ft. deep dished bottom. Fitted one 4 in. and one 3 in. internal spray coils. Vessel test pressure 7 p.s.i., coil test pressure 100 p.si.. Stainless steel level gauge fittings etc.

VERTICAL TOTALLY ENCLOSED BLUE GLASS LINED VESSEL by **Pfaudler,** 3 ft. 6 in. dia. by 4 ft. deep. Dished top with hinged 18 in. dia. manhole, dished bottom with 1½ in. i.d. centre outlet and 1 in. i.d. side runoff. FOUR AVAILABLE.

DRYING PLANT by **Dunford & Elliott** comprising Rotary Louvre Drier mild steel construction 19 ft. 3 in. long by 3 ft. 11 in. dia., including vaned discharge section 3 ft. 3 in. long, mounted on two roller paths, drive through girth gear and pinion and worm reduction gearbox with motor. Oil fired Horizontal mild steel Combustion Chamber 7 ft. long by 4 ft. dia. with 4½ in. thick firebrick lining and mild steel ducting to Sturtevant 24 in. cast iron split case fan, ducting, etc.

ROTARY DRIER by **Edgar Allen,** 24 ft. 7 in. long by 4 ft. 11 in. dia. running on two roller paths, having nominal rating of 10 tons per hour. Fitted with No. 6 size Mastoker Underfeed Stoker with capacity of 270 lbs. of coal per hour. Drive by 10 h.p. motor through reduction gear to main girth gear on Drier. Plant complete with cyclone, etc.

GEORGE COHEN
Sons & Co. Ltd.,
Wood Lane, London, W.12.
(Shepherds Bush 2070)
Stanningley, Nr. Leeds
(Pudsey 2241)

NEARLY NEW Steam Jacketted Double 'Z' Mixer, approximately 20 gallons, with built in Reduction Gear. Insured 50 lb. p.s.i. water pressure in Jacket. Winkworth Machinery Limited, 65 High Street, Staines, Middlesex. Telephone: 55951/3.

***BOX NUMBERS:** Reply c/o "Chemical Age" · Bouverie House · Fleet Street EC4.*

PLANT AND MACHINERY FOR SALE: continued

Mild Steel Vertical Jacketed Pan, 48 in. I.D. by 54 in. deep, heavy domed cover plate 2 in. thick slotted for 1¼ in. Lock Bolts. Suitable for Vulcanising, Tested Hydraulic 100 lb. PSI. Price £120 0s. 0d. Ex stores.

THOMPSON & SON (MILLWALL) LTD.,
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